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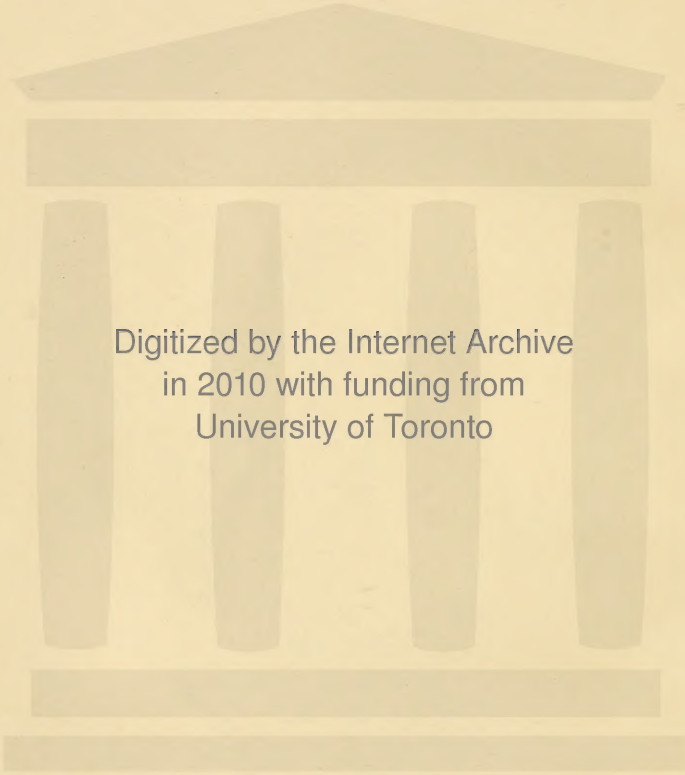
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THE

OTTAWA NATURALIST

Being Volume XXVII of the

TRANSACTIONS

OF THE

OTTAWA FIELD-NATURALISTS' CLUB.

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The Ottawa Field-Naturalists' Club.

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THE OTTAWA NATURALIST

VOL. XXV. OTTAWA, APRIL, 1911 No. 1

REPORT OF THE COUNCIL OF THE OTTAWA FIELD-NATURALISTS' CLUB FOR THE YEAR ENDING MARCH 21st, 1911.

In accordance with the new Constitution of the Club, the following report is largely a compilation of reports submitted by the various Branches of the Club and the Standing Committees of the Council.

Membership.

During the year 27 new members have been elected, making the present membership 316, composed of 308 Active Members and 8 Corresponding Members.

Publications Committee.

The bound publications belonging to the Club occupy a special section in the stack room of the Carnegie Library, where they will be available to the general public as soon as properly indexed.

The unbound copies of periodicals which are received by the Library regularly on behalf of the Club are placed on file in the reading room, for a time, after which they are laid away for binding or for such purpose as the Club may decide. The following is a list of these periodicals:—

1. The Nature Study Review.
2. The Auk.
3. The Canadian Entomologist.
4. Journal of the New York Entomological Society.
5. The Journal of Geography.
6. Le Naturaliste Canadien.
7. Journal of the Elisha Mitchell Scientific Society.
8. Transactions of the Botanical Society of Edinburgh.
9. Publications of the Field Museum of Natural History.
10. The Ohio Naturalist.
11. Torreya.
12. The Wilson Bulletin of Ornithology.

13. The University of California Chronicle.
14. Queen's Quarterly.
15. Bulletin of the New York Botanical Garden.
16. Bulletin of the American Museum of Natural History.
17. Proceedings of the Boston Society of Natural History.
18. Transactions of the Wisconsin Academy of Sciences.
19. Proceedings of the Indiana Academy of Science.
20. The Missouri Botanical Garden Reports.
21. Proceedings of the Hamilton Scientific Association.
22. Arkiv for Zoologi, Stockholm.
23. Arkiv for Botanik, Stockholm.

In addition to the above mentioned publications a considerable number of pamphlets dealing with a variety of subjects have been received during the year. Those of special value are preserved for future use as the Club directs.

The reserve copies of THE OTTAWA NATURALIST which have hitherto been stored in the old Geological Survey Museum have been removed to an upper room in the Osgoode Street Public School. The extra copies which were placed in the basement of the Normal School are still there, having been arranged in bundles and labelled during the year. We suggest that all spare copies and sets of THE NATURALIST be brought together in some more convenient place for the Librarian.

THE OTTAWA NATURALIST.

Volume XXIV. of THE OTTAWA NATURALIST, the official organ of the Club, has been published monthly under the editorship of Mr. Arthur Gibson. It consists of 236 pages and three plates.

The following are among the papers which appear in this volume:—

On Botany.

1. "Contributions from the Herbarium of the Geological Survey." J. M. Macoun.
2. "Plants Growing Wild and Without Cultivation in the County of Lambton, Ont." C. K. Dodge.
3. "Canadian Species of Thalictrum. IV." E. L. Greene.
4. "Fern Hunting in Ontario." F. J. A. Morris.
5. "Plant Physiology versus Psychology." H. T. Gussow.
6. "A Preliminary List of the Cratægi of the Ottawa District." Herbert Groh.
7. "Field Notes of Canadian Botany, II." E. L. Greene.
8. "Club Mosses." F. J. A. Morris.

On Entomology.

1. "House-Flies and the Public Health." C. Gordon Hewitt.
2. "The Imperial Moth." Arthur Gibson.
3. "Notes on Euxoa detersa Wlk. and E. personata Morr." John B. Smith.
4. "The Migration of Some Native Locusts." Norman Criddle.

On Geology.

1. "On Two New Trilobites from the 'Chazy' River Near Ottawa." Percy E. Raymond.
2. "Note on the Parietal Crest of Centrosaurus apertus and a Proposed New Generic Name for Stereocephalus tretus." L. M. Lambe.
3. "Preliminary Notes on the 'Chazy' Formation in the Vicinity of Ottawa." Percy E. Raymond.

On Ornithology.

1. "Stomach Contents of Some Canadian Birds." C. W. G. Eifrig.
2. "Winter Birds at Point Pelee, Ont." W. E. Saunders.
3. "Notes on the White-throated Sparrow." L. McI. Terrill.
4. "A Colony of Cliff Swallows and Others." Norman Criddle.
5. "The Birds of Ottawa." C. W. G. Eifrig.

This latter paper appeared in the December, January, February and March issues, and is an exceedingly valuable list of the Birds of the Ottawa district.

On Zoology.

1. "A Weasel's Home." S. E. Percival.

EXCURSIONS COMMITTEE.

The usual series of excursions, to the number of 13, was arranged for the spring and fall months. Nearly all were to localities often visited in the past, and chosen because of their all-round natural history features. The aim was to make them instructive and attractive to the non-scientifically trained members of the Club, as well as profitable to those who are able to do valuable original field work in any of the departments of the Club's activities. Enthusiastic leaders were always present to contribute to the success of these outings, and while some of the excursions were fairly well attended, it is, nevertheless, a regrettable fact that far too few of the members availed themselves of the splendid opportunities thus afforded for studying the plants, animals, rocks, etc., at first hand, and for partaking of the refreshing pleasure of an afternoon in the open country. For many of us these are the best and almost the only occasions when field study is possible.

The programme of excursions as arranged was as follows:—

April 16—Rockcliffe.
April 23—Britannia.
April 30—Billings' Bridge.
May 7—Blueberry Point.
May 14—Beaver Meadow.
May 21—Green's Creek (General).
May 28—McKay's Lake.
June 4—Macdonald College (in conjunction with Y.W.C.A.)
June 11—Leamy's Lake.
June 18—Hog's Back.
Sept. 24—Green's Creek.
Oct. 1—Beaver Meadow.
Oct. 8—Experimental Farm.

Owing to unfavorable weather several of these excursions had to be cancelled, the General excursion to Green's Creek being among them. Those which were held were reported in every case for THE OTTAWA NATURALIST by some member present.

LECTURES COMMITTEE

The course of lectures provided by the Club during the winter of 1910-11 consisted of seven events. Five of these were held in the Assembly Hall of the Normal School; and on each of these occasions the excellent lantern belonging to that institution afforded invaluable service, under the management of Mr. J. W. Gibson, in exhibiting to the audience the slides prepared by the lecturer for the elucidation of his subject.

The lecture of the 24th of January was delivered in the Hall of the Carnegie Library, and was illustrated with charts, crayon diagrams and sketches by the hand of Dr. Percy E. Raymond, the lecturer of the evening. The Annual Address of the President, Mr. Andrew Halkett, was also delivered in the Hall of the Carnegie Library and immediately preceded the Annual Meeting on the evening of 21st March.

The audiences present at these events varied from 75 to 250 persons. After the delivery of the lecture on each occasion opportunity was taken for questions and discussion in accordance with the immemorial practice of the Club. Many interesting exchanges of opinion and facts of personal observation in connection with the subject of the evening were thus made public.

The following is a list of the events:—

Dec. 6th, 1910—"Some Recent Developments in Canadian Fisheries." Prof. E. E. Prince, Dominion Commissioner of Fisheries.

Jan. 10th, 1911—"Conservation, or the Protection of Nature." Dr. C. Gordon Hewitt, Dominion Entomologist.

Jan. 24th, 1911—"Local Geology, the Rocks and their Fossils." Dr. Percy E. Raymond, of the Geological Survey.

Feb. 7th, 1911—"Insects Injurious to Orchard, Shade, and Ornamental Trees." Mr. J. M. Swaine, of Macdonald College, Que.

Feb. 21st, 1911—"Edible, Poisonous and Other Fungi." Mr. H. T. Gussow, Dominion Botanist.

March 7th, 1911—"How the Forest Grows." Mr. R. H. Campbell, Dominion Superintendent of Forestry.

March 21st, 1911—President's Annual Address. Mr. Andrew Halkett.

REPORTS OF BRANCHES.

THE BOTANICAL BRANCH.

The work of the Botanical Branch during the past year has been confined mainly to the papers and discussions in connection with the meetings of the Branch which have been held during the winter. Little field work in botany was done about Ottawa during the past season. Few young men in Ottawa are interested in systematic botany, and the older men seem to be too busy at their official duties to take time to study plants in the field. Prof. John Macoun spent the summer of 1910 in botanizing in Nova Scotia and added a number of new species to the flora of that province. Mr. James M. Macoun made very valuable collections about Hudson Bay. Mr. H. T. Gussow is doing very important work in investigating plant diseases, especially those relating to economic plants. Mr. H. Groh devoted considerable time during the summer of 1910 in studying the native Amelanchiers and also in noting the species of plants growing or establishing themselves in an evergreen plantation at the Central Experimental Farm.

The following meetings of the Botanical Branch have been held during the winter of 1910-11:—

1. "Reports of Field Work," given by Mr. R. B. Whyte. Jan. 7th, 1911.
2. "A Flora in the Making," by Mr. H. Groh. Jan. 28th, 1911.
3. "The Flora of the Barren Grounds." by Mr. J. M. Macoun. Feb. 11, 1911.
4. "Canadian Grasses," by Dr. M. O. Malte. Feb. 25th, 1911.
5. "The Composition of An Old Race of Cereals and Its Variability," by Mr. L. H. Newman. March 11th, 1911.

THE ENTOMOLOGICAL BRANCH.

The members of the Entomological Branch report that fair progress has been made during the past year in the knowledge of the insects of the district. A number of species were collected for the first time, and others of extremely rare occurrence were taken on several occasions. Two species are worth mentioning here. The Ghost-moth, *Sthenopis thule*, which was found at Ottawa in 1905, was again collected the past season, a single specimen being taken by Mr. A. Nicholls. In the Montreal district the insect is taken almost every year in fair numbers, but at Ottawa only two examples have as yet been captured. The large handsome insect, the Imperial Moth, *Basilona imperialis*, which is decidedly uncommon in Canada, must have been fairly abundant in the district, judging from the number of examples taken, mostly by certain individuals not specially interested in insects. Specimens were collected at Hull, Que., at Britannia and at the Experimental Farm. The Hull captures are most probably the only specimens which have ever been recorded from the Province of Quebec.

The Leaders hope that during the new Club year more members will take an interest in this branch of our work. The study of insects in the field is extremely fascinating and no branch of the Club's work offers a better, or so little known, field for investigation. So much is still to be learned regarding the life-habits of our insects, that anyone who makes careful observations can easily add to the known knowledge of many of these creatures. The Leaders of this Branch will gladly assist anyone who desires to take a deeper interest in the insects occurring in the Ottawa district. The field is a large one and the workers are few.

THE GEOLOGICAL BRANCH.

As in former years Leaders of this Branch attended the Saturday afternoon excursions and explained as far as possible the principal geological features of the localities visited. Dr. P. E. Raymond, a new member, has done considerable work in the Chazy formation near Ottawa. In THE OTTAWA NATURALIST for November, 1910, he described two new species of trilobites from this formation, and in the February number, 1911, he gave sections in the Chazy at Rockcliffe, Hog's Back, Westboro, near the Robillard quarries, Montreal Road, and Mechanicsville, with typical fossils from each layer. These sections will be of great value to students who wish to study this formation.

He finds that the sections in the vicinity of Ottawa show about 250 feet of strata between the Beekmantown (Calciferous) and the base of the Black River. The lower 125 to 135 feet he

correlates with the upper Chazy of the Champlain Valley and proposes for this part the name Aylmer formation. The upper portion of the section consisting of 115 to 125 feet contains fossils more nearly related to the Black River and offers a splendid field for future study.

The Club was represented at the meeting of the Royal Society of Canada by the President, Mr. Andrew Halkett.

The Treasurer's report shows a balance on hand of $21.48.

The thanks of the Club are due to Principal White for the use of the Normal School Assembly Hall, to the Library Board of the City Council, and to the Librarian, Mr. Burpee, for the use of the Lecture Hall and Committee Room of the Carnegie Library, to the gentlemen who have so kindly assisted us in our winter lecture course, and to the Press of the City for its co-operation in furthering the work of the Club.

All of which is respectfully submitted.

J. J. CARTER, *Secretary.*

NOTES FROM NEW BRUNSWICK.

GREY SQUIRREL.—On December 20th a fine specimen of Grey Squirrel (female) was taken on the eastern side of the St. John River about twenty-five miles above Fredericton, in York County. A few have perviously been taken, but the species is of sufficiently rare occurrence to put this capture on record. Total length, twenty inches; tail, seven and one-quarter; hind foot, two and three-quarters. The pelage was in beautiful condition.

CANADA JAY.—I also received from a friend a partial albino Canada Jay taken in the northern part of the province. The two central tail feathers are white with ashy spot on tips. The next pair are entirely white; remainder of tail about normal. Some of the primary feathers are white; the greater wing covers and part of the lesser wing covers white; balance of plumage natural. The skin was in a badly mutilated condition, but the abnormal colour has been fairly well brought out in mounting.

MAMMALS CAUGHT IN TRAP.—My small boy recently found, in one of his steel traps, two mammals caught at the same time, while taking a feast from the bait. Occasionally we have known of two mammals (usually mice) being taken in a trap simultaneously, but it was an interesting surprise to obtain at one catch a flying squirrel and a short-tailed shrew, as was the case in this instance.

WM. H. MOORE, SCOTCH LAKE, N.B.

TREASURER'S STATEMENT FOR YEAR ENDING 21ST MARCH, 1911.

RECEIPTS.

Balance from previous year		$ 31.85
Subscriptions:—		
Arrears	$ 49.00	
1910-1911	181.00	
1911-1912, in advance	25.00	
		255.00
Advertisements in OTTAWA NATURALIST		108.30
OTTAWA NATURALISTS sold		4.50
Authors' extras sold		27.02
Maps of Ottawa sold		.35
Government grant		200.00
		$627.02

EXPENDITURE.

Printing OTTAWA NATURALIST, Vol. XXIV., 11 Nos., including cover	$399.88	
Illustrations	19.50	
Authors' extras	34.05	
Miscellaneous printing: circulars, mailing envelopes, etc	35.11	
	$488.54	
Postage on OTTAWA NATURALIST	32.34	
Editor	50.00	
	$570.88	
Less 2 per cent. for cash on some accounts of printer	1.45	
		569.43
Soiree expenses		16.13
Sundry expenses, postage, etc		19.98
Balance		21.48
		$627.02

HERBERT GROH,
Treasurer.

Examined and found correct,

R. B WHYTE,
J. BALLANTYNE. } *Auditors.*

SUMMARY OF A LECTURE DELIVERED BEFORE THE OTTAWA FIELD-NATURALISTS' CLUB, ON JAN. 28TH, 1911, BY DR. PERCY E. RAYMOND.

The subject of the talk, the "Local Geology," had been so often and so admirably treated before the Society, that the speaker did not attempt to repeat the details of the local distribution of the rocks and fossils, but made the local section the basis of a brief exposition of what has been recently accomplished in mapping the ancient geography of the region. The older view, that throughout Ordovician time the Ottawa valley was continuously an arm of the sea has been modified in recent years by critical studies of the fossils, and the speaker endeavoured to show the great value of fossils in studying the former distribution of lands and seas. It was pointed out that at the present time the fauna of the Pacific Ocean was very different from that along our eastern coasts, and that it had been found that the fossils showed similar differences in contemporaneous faunas living in separated ocean basins. The two great basins which had affected this region were the Atlantic and the great interior sea.

The most ancient fossiliferous sedimentary rocks, the lower Cambrian, do not seem to have been deposited in this region, though an arm of the sea passed through the St. Lawrence and Champlain valleys at this time. During a large part or all of Middle Cambrian time, both the Ottawa and Champlain regions were above sea level, and the next inundation, the first to reach Ottawa, came from the Gulf of Mexico. In late Upper Cambrian time, however, the sea seems to have broken through to the Atlantic in the St. Lawrence valley, for at Levis we have a mixture of interior and European types of fossils. At this time the water was very shallow in the Ottawa valley, and the arm of the sea was probably in the form of a bay opening to the eastward. In this bay was deposited the Potsdam sandstone.

During the early part of Beekmantown time the Ottawa region was again above the water level, but toward the later part, the sea to the eastward again encroached upon the land, bringing in a part of the Upper Beekmantown (Ft. Cassin) fauna. As the land was submerged, the sea seems to have at first derived a large part of its sediment from the more ancient Potsdam sandstone, thus forming the so-called passage beds of Potsdam sands with Beekmantown fossils.

After Beekmantown time there was a general emergence of the Ottawa and Champlain valleys, and the Ottawa region was land until the latter part of Chazy time. The Chazy sea was an

arm of the Atlantic which advanced up the St. Lawrence trough and into the Champlain valley long before it reached Montreal or Ottawa. In the later part of Chazy time, however, there was a shallow bay extending as far up the Ottawa valley as Allumette Island, while deeper water existed at the same time about Montreal. At the end of Chazy time the land was tilted, so that the sea was forced to retreat eastward and the interior sea again reached the Ottawa region, this time coming across west of the Adirondacks. In this sea were deposited the Lowville limestone and shale, 125 feet thick at Ottawa. In Lowville time this sea does not seem to have extended very far east of Montreal, and its advance into the region east of that place was accompanied by the erosion of the upper beds of the Chazy.

In Black River time this same sea continued to advance down the St. Lawrence till it broke through into the Atlantic, and in the limestones formed at this time we find a mixture of inland and Atlantic types again.

Although the general facts of the subsequent history of the region are known, the details are still so obscure that no attempt was made to present maps showing the local conditions

Persons interested in a further study of this subject are referred to Prof. Schuchert's' great work on the Paleogeography of North America, published as a bulletin of the Geological Society of America in 1910.

MEETING OF BOTANICAL BRANCH.

Held on Jan. 28th at the home of Mr. Geo. H. Clark, the following members being present, in addition to the host: Messrs. Whyte, W. T. Macoun, Michaud, Malte, Campbell, Sirett, Bunting, Carter, Blackader and Groh.

On assembling the company first examined some roots of ginseng which had been collected at Wakefield, Que., and were shown by Dr. Blackader. This plant is rare in the Ottawa district, but some of the members were able to report its former occurrence in localities close to the city.

Mr. Clark spoke briefly about large sets of representative Canadian seeds which have been put up by the Seed Branch, and about certain recent developments in Canadian vegetable seed production.

The subject for the evening was, "A Forest Flora in the Making"; in other words, a report on a botanical survey of a plantation of Scotch and Austrian pines at the Experimental Farm. It was presented by Mr. H. Groh, who made the observations during the past summer. The plantation in question is

about 50 feet by 300 feet in extent, and adjoins the Dominion Observatory. It was started in 1887 on what was then a cultivated field. The trees were planted mostly three feet apart each way, but have been thinned out considerably since, as individuals fell behind in the struggle for light. Those which remain are now over thirty feet in average height and their tops unite to form a continuous canopy overhead, through which little direct light filters. Natural pruning has kept the trunks comparatively free of large branches, and about five years ago the lower branches were all trimmed off. On the sides of the plantation an untrimmed border of more densely branching Norway Spruce shuts out the light from that quarter and acts as a barrier to the sod. In only one place within, on an area of a few square yards, is there sufficient light to admit of the formation of a sod; otherwise the conditions are uniformly those of a dense pine forest. The floor has a moist covering of several inches of needles, the soil beneath being a light sandy loam with some gravel.

To casual observation, vegetation was almost wanting in this area, plants occurring for the most part as isolated individuals. Nevertheless as the result of four careful examinations in as many months, forty-five species of fern and flowering plants were recorded, as well as several mushrooms and other fungi. Many of these were merely seedlings or immature plants, but twenty-four were found to be flowering, and in most cases producing seed. Specimens of the latter were shown, and a tabulated list of all the plants was distributed. It showed that there were represented twenty-five families and thirty-seven genera, no family having more than three representatives, except the Compositæ, which had twelve. Twenty-two were indigenous, seven were annuals, three winter annuals, five biennials and thirty perennials.

A noteworthy fact about the plants recorded is that almost all are field, not forest plants; and practically none had the appearance of being well established in their present home. This led to the deduction that vegetation had been absent entirely until recently; probably until the trimming up of the trees five years ago admitted more light and circulating air to the floor of the plantation. An older forest society might be expected to contain a larger proportion of indigenous and true forest plants. Assuming it to be true that this flora is of recent development, we may ask, how has it arisen? Plant migration and adaptability to environment are two factors which would operate together in determining its composition. The former, we may suppose, has been continuously at work; but only when the environment became such that it was tolerable for certain of the plants brought into it, could there be any result. In illus-

tration of this fact, the observation was made that among various seeds which have been found in the snow in this area this winter, the most abundant is birch, which, nevertheless, was not represented by living plants in the summer. The birch cannot thrive without the light of the open and therefore fails to gain a foothold here. Similarly many other species must perish when brought by the vagaries of their migrations to this plantation; and this is just what has been going on with all species, until recently. On the other hand, many forest and other plants which would be perfectly at home in this environment, or would at least be capable of enduring it, have not yet reached here. Among the plants collected which seem best at home are a fern, *Aspidium spinulosum*, var. *intermedium;* a violet, *Viola blanda;* a bedstraw, *Galium triflorum*, and two sedges, *Carex Deweyana* and *C. varia*, as also the various fungi, which are no doubt at their best in such a habitat.

Many of the plants not so well adapted for enduring shade showed plainly its effects upon their habit or structure, as for instance, by their broader, greener and more succulent leaves, their elongated internodes, etc. The prickly lettuce or compass plant, *Lactuca scariola*, which ordinarily turns its leaves edgewise to escape the force of the strong mid-day sun, was here compelled to spread them after the fashion of other plants, so as to catch the full benefit of the light which filtered down to them.

Notice was taken of the various ways in which the seeds of these plants may have been brought to the plantation. Animal life and the wind were no doubt the principal agencies. The seed may have adhered with mud to the feet of men or animals, or they may have been drifted along over the frozen snow. Three or four of them are armed with prickles or barbed processes for attachment to animals, etc. Some would be eaten by birds and other animals and then be deposited in a fit state for germination at this place, and six possessed fleshy fruits indicating this means of dispersal. Another six were provided with wings, while ten had pappus tufts, enabling them to be carried for greater or less distances through the air.

Such a survey as described, opens up a variety of interesting problems which can only be settled by repeating the observations during a series of years. No society of plants can be fixed and stable at such an early stage of its history, and each year should contribute something new to its composition.

H. G.

CONCHOLOGICAL NOTES.

The fresh water pearl mussel, *Margitana margaritifera*, was recently collected by one of my sons in the Ste. Croix River near St. Stephen, New Brunswick. The shells are small in comparison with specimens from the St. Lawrence Valley, and none contained pearls. Larger, and especially cortorted, shells, from rapid water would no doubt produce, as such shell do in other countries, the concretions which are sometimes so beautiful and highly prized. In Saxony a profitable fishery of this mussel has been carried on as a state enterprise for hundreds of years. Shells presenting the characters known to indicate the true pearl-bearers are carefully opened with a wooden wedge, searched and if found barren returned uninjured to the streams, from which they are again taken in a year or two.

A shell of the same genus, not previously reported from Ontario, was recently found in the Winnipeg River at Kenora, below the falls. It is the flat pearl shell, *Margaritana complanata*, abundant throughout the Mississippi basin, and extending northward into Manitoba.

The rare *Planorbis corpulentus*, originally described in 1830 by Thomas Say, from the Lake of the Woods and Rainy Lake, and the still rarer *Lymnæa binneyi*, Tryon, were found near Fort Frances. Tryon's shell has unfortunately shared the fate to which his *Planorbis binneyi* was so long subjected. It was thought to be a form of *Lymnæa emarginata*, as *Pl. binneyi* was though to be either a form of *trivolvis* or Say's *Pl. corpulentus*. *L. binneyi* is a beautiful, large and distinct species, of which I hope soon to see a plate in the NATURALIST. *Pl. binneyi* is the very large *Planorbis* which occurs in the Rideau just west of Billing's Bridge, especially on the north shore, above the rapids. I have found it at several other points in the same river; in the Rideau Canal, at the Exhibition Grounds, in Meach Lake—one specimen only—and in Giroux Lake, near Cobalt. In certain localities in the Rideau Canal and River it is associated with *Pl. trivolvis*, but it does not seem to occur in the Ottawa, where *Pl. trivolvis* is in every bay a common shell.

The numerous specimens of *Pl. corpulentus* which Say collected were lost* and the shell which he figures, Plate 15, Fig. 9, was procured from Dr. Bigsby. My shells were collected near Kettle Falls, at the east end of Rainy Lake. Many are larger than those measured by Say. He rightly describes it as "closely allied to *Pl. trivolvis* but much less rounded on the sides of the whorls. The carinæ are more prominent, the upper side

*Appendix to Narrative of Long's Expedition, London, 1825, page 10.

is much more frequently flattened, the labrum is less rounded, and the whole shell is larger and higher in proportion to its width, and the aperture extends both above and below the penultimate whorl."

The shell described and figured by DeKay as *Pl. corpulentus*, Say, Zool. of New York, 1843, Pt. V., p. 64, and Pl. VIII, Fig. 185, is undoubtedly *Pl. binneyi*, Tryon. DeKay's error is to a large extent responsible for the confusion of the two species, which are in range as well as appearance quite distinct.

Of the Sphæria or "little-ball shells" several species new to the Ottawa list, and some probably undescribed, were collected in 1910. The most notable are *Sph. transversum*, Say, which is found in great numbers in the Rideau Canal along the right bank just above Hartwell's Locks and in the by-wash from the locks, and *Sph. crassum*, Sterki. But of these more anon.—L.

BLUE JAY IMITATING RED-SHOULDERED HAWK: ABSENCE OF CONES ON EVERGREEN TREES.

On December 10th whilst at Bury, Compton County, Que., I was surprised at hearing the cry of a Red-shouldered Hawk thrice repeated, —Keé-oo; Keé-oo; Keé-oo. Turning, I expected to see the bird circling above, but a thorough search failed to reveal it. One hundred yards away stood a small district school-house, and beyond, as far as the eye could reach, stretched an evergreen forest,—not exactly the locality for *lineatus*. In the opposite direction were hills, with patches of hardwood, a summer home of the Broad-winged Hawk. As the Red-shouldered Hawk is uncommon in this locality and considering the lateness of the season with the thermometer registering below zero, I was bound to have a look at the author of these cries. Thinking that the boys might have a wing-clipped bird, I started to search in the rear of the school, when suddenly a Blue Jay appeared to view in the lower branches of an elm. Fifteen minutes' wait failed to reveal any other bird life, and I became convinced that the Jay was the author of the cries, though it failed to repeat its efforts.

I was informed by residents of this district that Red Squirrels have been unusually numerous about their barns this fall. There is an excellent reason for this as there are no cones. I failed to find a single conifer bearing seed, and these seeds are bread and meat to the Squirrel, as the nut crop is insignificant and especially so this season. Are these conditions general?

L. McIVER TERRILL, WESTMOUNT, QUE.

THE OTTAWA NATURALIST

VOL. XXV. OTTAWA, MAY, 1911 No. 2

ON ARCTOTHERIUM FROM THE PLEISTOCENE OF YUKON.*

By Lawrence M. Lambe, F.G.S., F.R.S.C.,
Vertetrate Palæontologist, Geological Survey, Ottawa.

A well preserved skull of the giant bear Arctotherium has lately been acquired by the Geological Survey and is of interest in many particulars. The specimen consists of the skull without the lower jaw and was discovered at Gold-run Creek, Yukon, in frozen Pleistocene deposits at a depth of forty feet beneath the surface of the ground.

This widely distributed but imperfectly known genus is distinctive of the Pleistocene of the American continents. In North America three species have been described, viz.: *A. pristinum* (Leidy), from South Carolina; *A. simum*, Cope, from California, and *A. haplodon*, Cope, from Pennsylvania. The South American species, *A. bonariense* (P. Gervais) is from the River Plata, Buenos Ayres.

The discovery of the skull at Gold-run creek extends the known range of the genus very much northward, as this is the first record of the occurrence of Arctotherium in the northern half of this continent.

As indicated principally by the teeth, Arctotherium is intermediate between the old-world Hyænarctos and the genus Ursus, and is notable for its great size which equalled, if it did not exceed, the largest species of both these genera.

The Yukon skull is remarkably broad in proportion to its length and represents an individual of great physical power and bulk.

It is in a good state of preservation, but has suffered injury in the upper anterior portion, the nasals being absent with the greater part of the forehead broken away. On the left side the second incisor and the premolars in advance of the fourth have fallen out and been lost, as have also the three incisors, the premolars in front of the fourth, and the second molar, of the right side. Otherwise the specimen is perfect.

* Communicated by permission of the Director of the Geological Survey.

The skull derives its great breadth principally from the outward spread of the zygomatic arches, a measurement across them nearly equalling three-fourths the length of the skull. In advance of the orbits it is short and broad. The forehead is high, moderately broad, and descends convexly downward in front. The breadth across the postorbital processes of the frontals is contained about two and a half times in the skull's length. Viewing the skull from above there is a rapid narrowing behind the postorbital process which is accentuated by the general and marked depression of the surface between the upper portion of the base of the zygomatic arch and the sagittal crest, a very slight swelling in the middle of this surface alone saving it from being concave throughout. Between the inner limits of the temporal fossæ the breadth of the brain case is slightly less than one-third the maximum breadth of the skull. The sagittal crest is high and strongly developed. In outline, as seen from above, the cranium is pointed behind, the lambdoidal ridges, marking the upper limit of the occipital bone, meeting at an angle of 90°. The inion overhangs the posterior curve of the occipital condyles to the extent of about 43 mm. The surface of the occipital is strongly concave from the condyles up and is rather flat in a transverse direction. A high, thin occipital crest is continuous between the external occipital protuberance (inion) and the upper margin of the foramen magnum, and, as already mentioned, there is a considerable overhang to the upper portion of the occiput.

The palate is broad and, for the most part, slightly concave, both longitudinally and transversely, but in advance of the anterior palatine foramina its surface curves rapidly downward. From the second molars it narrows evenly and rapidly backward to the posterior nares, which are set rather far back. In line with the posterior nares a horizontal measurement taken across the vertical plates of the palatines is only 70 mm. The posterior narial emargination is rather narrowly rounded anteriorly. The distance from the posterior nares to the occipital condyles is short compared wiht the length of the hard palate. The zygomatic fossæ are triangular and as wide as long, their greatest width being but slightly in advance of the glenoid cavity. The anterior basal margin of the occipital condyles, viewing these surfaces from beneath, form an even transverse curve arching but slightly forward, the flatness of the curve being conspicuous.

Between the canine and the fourth premolar are three alveoli, which are interpreted as being those for the first premolar and for a double-rooted third premolar. The anterior one of these three alveoli is close to the canine. Those for the supposed

double-rooted third premolar are self-contained in distinct, clean-cut peripheral margins without any elevation of the bone externally or internally between them, and are separated only by a sharp-edged septum of bone which is at the same level as, and contributes equally to, the margins of both alveoli. Between the alveolus for the first premolar and the anterior one of the third is a space measuring 6 mm.

	Mm.
Diameter of alveolus of first premolar:	
Antero-posterior	13
Transverse	8
Diameter of anterior alveolus of third premolar:	
Antero-posterior	7.5
Transverse	6
Diameter of posterior alveolus of third premolar:	
Antero-posterior	10.5
Transverse	7

Of the incisors the third is much the largest, and the second is slightly smaller than the first. The fourth premolar has a well-developed inner cusp in line with the mid-length of the tooth, adding to its breadth and causing the cross section of the crown to be subtriangular in outline, the exterior surface of the crown exceeding in length the two inner and equal sides. The first molar is subquadrangular in outline, its breadth nearly equalling its maximum antero-posterior diameter which is at the outer side of the crown. The second molar is broadest in front, and narrows rapidly backward; its maximum breadth is equal to two-thirds of its length. All the teeth are much worn.

	Mm.
Diameter of first incisor:	
Antero-posterior	12.5
Transverse	8
Diameter of alveolus of second incisor:	
Antero-posterior	13
Transverse	7
Diameter of third incisor:	
Antero-posterior	17
Transverse	18
Diameter of fourth premolar:	
Antero-posterior	22.5
Transverse	17
Diameter of first molar:	
Antero-posterior	27
Transverse	25
Diameter of second molar:	
Antero-posterior	37.5
Transverse	25

	Mm.
Space occupied by molars and fourth premolar...	84
Space occupied by molars and premolars.....	123
Space occupied by the six incisors.....	74
Length of canine (worn at tip) protruding beyond inner edge of alveolus.....	60
Transverse diameter of canine at edge of alveolus	26
Antero-posterior diameter of canine at edge of alveolus	42

A large median foramen (length 19 mm., width 11 mm.) occurs behind the anterior palatine foramina, its centre being in line with the posterior edge of the alveolus of the first premolar. The posterior palatine foramina are placed rather far back in line with the hinder half of the second molars. There are two external infraorbital foramina, one above the other, and distant about 17 mm. apart, in line with the anterior portion of the first molar.

	Mm.
Length of skull from inion to anterior end of premaxillary (20½ inches).....	521
Length of skull along base from vertically below apex of inion to anterior end of premaxillary (19$\frac{9}{10}$ in.).....	506
Length of skull from posterior edge of occipital condyle to anterior end of premaxillary.....	463
Distance from anterior end of premaxillary to posterior nares.....	260
Elevation of forehead vertically above posterior extremity of posterior molar (estimated).....	200
Width between inner border of posterior molars...	93
Width between inner edges of alveoli of canines...	74
Extension backward of sagittal crest beyond occipital condyle.....	43
Extreme breadth across zygomatic arches.....	364
Breadth across postorbital processes of frontals...	205
Height of sagittal crest vertically above postglenoid process.....	215
Breadth across mastoid processes of periotics.....	240
Combined breadth of occipital condyles.....	89
Diameter of foramen magnum:	
Vertical.....	39
Transverse.....	40

The Gold-run creek skull is considered to represent a species of Arctotherium, hitherto undescribed, for which the name *yukonense* is proposed, with the skull as the type (Cat. No. 7438).

It approaches closest to *A. simum*, Cope*, from which, however, it differs in general proportions as well as in a number of particulars.

In general shape it is broader throughout, except axially, behind the hard palate and including the brain case and forehead, where it is narrower; its height in its posterior half is less.

Comparing the Yukon skull further with the Californian one the following differences are apparent: (1) The breadth across the maxillæ, over the swelling for the root of the canine and in line with the median foramen in the palate, is greater. (2) The breadth across the postorbital processes is less. (3) The brain case is smaller, causing a more rapid contraction of the upper portion of the skull backward from the postorbital processes; the narrowness is here accentuated by the greater height and farther backward extension of the sagittal crest. (4) The molar-premolar series occupy a shorter space. The molars and fourth premolar are smaller, and the premolars in advance of the fourth are less crowded. (5) The median anterior foramen, as also the posterior palatine foramina occupy more posterior positions relative to the teeth. (6) The posterior nares is farther back from the second molar, although the hard palate apparently has the same proportionate length. The posterior narial opening is narrower and more pointed in front. (7) The breadth across the palatines at the posterior nares is much less. (8) The breadth across the mastoid processes of the periotics is much greater. (9) The occipital condyles are narrower and, as seen from below, their anterior margins are almost at right angles to the longitudinal axis of the skull, and are not directed obliquely backward as in *A. simum*.

The following measurements of the Californian skull, as given by Cope, are:—

	Mm.
Length along base from below apex of inion to premaxillary	387
The same in *A. yukonense*	506
Elevation of forehead vertically above the posterior extremity of the last molar	141
The same in *A. yukonense* (estimated)	200
Width between inner border of posterior molars	76
The same in *A. yukonense*	93

A. yukonense exceeded in size the largest of the living bears, viz.: the Kadiak or Alaska Peninsula bear (*Ursus middendorffi*) described by Merriam in his Preliminary Synopsis of the American

*The American Naturalist, 1879, vol. XIII, p. 791 and 800; 1891, vol. XXV, p. 997, pl. XXI, figs. 1, 2 and 3.

Bears, Proceedings of the Biological Society of Washington, Vol. ix, pp. 65-82, pls. 4-6, April. 1896. In this paper Dr. Merriam gives 440 mm. (17⅜ inches) as the greatest length (front of premaxillary to end of occipital crest), and 277 mm. as the zygomatic breadth of the largest skull (type of the species) seen by him. Corresponding measurements in *A. yukonense* are 521 mm. (20½ inches) and 364 mm., the breadth being proportionally greater in the Yukon skull.

In general shape the skull of *Ursus middendorffi* shews much resemblance to that of *A. yukonense*. The writer has not had the opportunity of studying the dentition of the former species, but if the teeth depart in any particular from the usual Ursus type it would be interesting to note if any approach toward the dentition of Arctotherium is indicated. In *U. middendorffi* we may have the descendant of *A. yukonense*, the giant form of the Pleistocene of the extreme north-west.

The great Cave Bear (*Ursus spelæus*) was apparently of about the same height and length as the western North American Arctotherium, although the latter animal was probably of heavier build, and its broad, high head with a decidedly short face and nose would give the living animal an appearance quite different from that of the long-nosed *U. spelæus*.

The skull of *U. spelæus* from Gailenreuth, near Muggendorf, Bavaria, figured by Owen in his History of British Fossil Mammals and Birds, 1846, has a length (inion to premaxillary) exceeding that of the Gold-run skull by half an inch. In the same publication is a figure of a canine (fig. 29) referred to *U. spelæus*, from Kent's Hole, Torquay, which is almost as large as the canines of the skull from Gold-run creek.

Another skull of *U. spelæus*, from Banwell, England, is, using a corresponding measurement, only one quarter of an inch shorter than the Gold-run skull (Palæontographical Society, 1906, a Monograph of the British Pleistocene Mammalia, Vol. ii., pt. ii., The Bears, by S. H. Reymolds, pl. 1, fig. 1).

EXPLANATION OF PLATES.

Plate I.—Right lateral aspect of the skull (type) of *Arctotherium yukonense* (upper figure). Occipital aspect of the same (lower figure).

Plate II.—Palatal view of the same skull.

Plate III.—View of the same from above.

Figures one-fourth natural size, linear.

THE SPRING MIGRATION OF BIRDS AT FISHERMANS ISLAND, TORONTO, 1910.

BY J. A. MUNRO.

The eastern portion of the sandbar to the south of Toronto, enclosing Ashbridges Bay, with its wide expanse of marsh and weedy lagoons and called collectively Fishermans Island, has been known for many years by the local ornithologists as one of the best vantage points in the province from which to study the ever interesting bird migration. The vast area of marsh now rapidly being reclaimed for commercial purposes, the once clear lagoons, poisoned by sewage, and the rows of cottages on the former feeding ground of Godwit and Curlew, are indications that the old order of things is fast giving way to a less beautiful if more utilitarian industrial era, with its attendant ills of reeking chimneys and crowded docks. As the locality is changing so rapidly, a short topographical description will be necessary.

There is a more or less authenticated tradition to the effect that many years ago a ridge of pine and hardwood extended from where the eastern channel is now cut through for several miles eastward. Black squirrels, mink, foxes and hares were plentiful. No trace of this ridge, said to have been twenty or thirty feet high, now remains.

The present beach, for the most part perfectly flat, has in several places an elevation of about two feet above the surface of the lake, and is sparsely covered with seedling poplars and willows. Between the Eastern Gap on the west and Coatsworths Cut on the east, the beach extends for about three miles, and is about four hundred yards wide at the widest part. At both the eastern and western ends of the beach many summer cottages have been built. Between the two settlements there is a park reservation about one mile long. This is the only portion of the sandbar that retains its natural features.

In the lake, in front of the cottages at the west end of the beach and about fifty yards south of the beach proper, a long narrow sandbar has recently been piled up by natural causes, forming a wide pond, where several species of marsh weeds have taken root. Many records were made beside this "Beach Pond", and it was on the narrow sandbar that the Herring Gulls, of which a record follows, congregated all summer.

Near the western end of the sandbar there is a wooden breakwater and a roadway running north and joining the island to the city. The breakwater also serves to separate Ashbridges Bay and Toronto Bay. Along the southern portion of the roadway there is a considerable growth of willows and balm of gilead.

These, the only large trees on the island, prove a great attraction to warblers, sparrows and other small migrants.

Along the north shore of the sandbar, fringed by rushes and *Phragmites* for the greater part of its length, many varieties of plants find conditions suitable to their development. Several species of *Solidago*, Lobeliaceæ, *Gerardia purpurea*, Turtlehead and many beautiful Graminaceæ. During May and June the sand is yellow with the blossoms of *Potentilla anserina*.

The wide stretch of bog in the south-west corner of Ashbridges Bay is cut up by a chain of shallow weedy lagoons, known by the local sportsmen as "Knockem Pond", "The Deep Hole" and "The Lilyweed Pond." The waste oil deposited in the bay by the gas works has killed off a number of the less hardy water plants, but such species as Pickerel weed, Arrow-head and three varieties of Nymphaea are still abundant. Florida Gallinules, American and Least Bitterns, Sora and Virginia Rails, Long-b. Marsh Wrens, Red-winged Blackbirds, Swamp Sparrows, and occasionally Coots, Red-billed Grebe and Blue-winged Teal breed in the bog. The Gallinules, Rails and the more wary species choose the less accessible places where the vegetation is too dense to allow the passage of a canoe and the bottom too treacherous to admit of wading.

The fallowing records were made between January 1st and July 10th, 1910:—

HOLBOELL'S GREBE.—One seen on April 2nd, feeding in "Knockem Pond." It allowed a canoe to approach within sixty yards before taking flight. May 2nd, one seen in the "Beach Pond". May 3rd, two seen in Toronto Bay, feeding along the island shore.

HORNED GREBE.—March 5th, three seen in the lake swimming close to the ice banks on the shore. No more were seen until April 16th. From that date until April 23rd they were fairly plentiful in "Knockem Pond" and "The Deep Hole." On April 17th three were seen asleep with their heads on their backs.

RED-BILLED GREBE.—One seen in "Knockem Pond" on March 31st. Two on April 2nd. On April 9th and 10th they were quite numerous. None were seen after April 10th. In former years several pairs always nested in the marsh.

LOON.—May 13th, seven were seen swimming up the lake not far from the shore. Until the end of May two or more were seen daily. The last spring record was made on June 12th, when a single bird flew over the beach.

GLAUCOUS GULL.—May 30th, one seen on the sandbar among a flock of Herring Gulls.

HERRING GULL.—During January and February single birds

and flocks of six and seven were seen. In the first week of March they began to congregate on the ice on "Knockem Pond" and Ashbridges Bay. Sometimes the flock numbered five or six hundred. They always left the ice at dusk and flew far out in the lake. Evidently they spent little time in feeding as they remained almost motionless on the ice for hours at a time. On March 24th, the ice was broken up and the flock was disbanded until March 28th, when they gathered again on the sandbar in the lake. Until July 7th, when the last record was made, there was a daily concourse on the bar, their numbers sometimes augmented by flocks of Ring-bills, Bonapartes and Caspian Terns. The number of birds in the flock varied from fifty to three hundred. During the latter part of June and the first week in July young birds predominated. The hard sand was white with their droppings and feathers. Several castings of fish bones were found.

RING-BILLED GULL.—May 19th, twelve seen on the sandbar in company with the Herring Gulls. Small flocks arrived daily until May 26th, when 165 were counted. The greater part of the flock had left by June 1st, but a few were seen daily until July 7th. As a rule they mixed indiscriminately with the Herring Gulls, but on several occasions they were seen in separate flocks ten or fifteen yards from the larger gulls.

BONAPARTE'S GULL.—May 6th, six seen with the Herring Gulls. On May 21st eight were seen, and by May 31st there were twenty in the flock. On July 1st adults and young began to return in daily increasing numbers. On July 7th three hundred were counted.

CASPIAN TERN.—May 1st, four on the sandbar with the Herring Gulls; May 3rd, forty-five on the sandbar. They were very noisy, their voices harsh and rasping. They had been watched by many admiring eyes for some twenty minutes, when suddenly they rose from the sand, and as they circled over the water the sunlight glittered on their snowy plumage, throwing into relief their black caps and scarlet bills. In a few minutes they formed into a long straggling flock and flew in a northerly direction about forty yards above the beach. Three or four were seen daily until June 8th.

COMMON TERN.—From May 13th until June 7th they were quite numerous, flying over the beach in flocks of seven to twenty.

BLACK TERN.—May 15th, a flock of six seen flying over "The Deep Hole." On June 26th a pair were seen circling over the bog.

AMERICAN MERGANSER.—March 29th, two in the lake.

April 3rd, four seen flying over the beach. Between April 10th and April 23rd they were fairly numerous.

RED-BREASTED MERGANSER.—Numerous from March 31st until May 14th. A few single birds and small flocks were seen until May 28th.

HOODED MERGANSER.—May 4th, a flock of nine in the "Beach Pond."

BLACK DUCK.—Flocks of three to eight seen between March 6th and April 21st. May 24th, four seen flying over the bog.

AMERICAN WIDGEON.—March 4th, a pointer flushed four, from the long grass at the edge of the bog. On April 17th four were seen in "Knockem Pond."

GREEN-WINGED TEAL.—A flock of eight seen in "Knockem Pond."

BLUE-WINGED TEAL.—April 25th, early in the morning, a pair flew over the beach. April 30th, one seen swimming along the shore of "Knockem Pond." June 12th, flushed a pair from a shallow pool near the edge of the bog.

SHOVELLER.—March 30th, one seen flying over "Knockem Pond." April 2nd, one seen flying over the marsh.

PINTAIL.—A flock of eighteen seen flying over the marsh.

WOOD DUCK.—March 30th, two seen in "Knockem Pond." April 2nd, a pair seen flying over the beach. May 17th, one drake seen. May 24th, two seen flying across "The Deep Hole."

REDHEAD.—February 14th, a flock of seventy-five feeding in a piece of open water, Toronto Bay. March 6th, two, in company with a large flock of Scaup Ducks in Toronto Bay near the Eastern Gap. April 10th, several small flocks seen flying up the lake.

SCAUP DUCK.—March 6th, a flock of 125 in Toronto Bay near the Eastern Gap, and a flock of 250 near the island shore. They were quite plentiful until May 24th. On June 19th a single male was seen swimming along the edge of the marsh in Ashbridges Bay.

LESSER SCAUP DUCK.—April 22nd, a flock of 600 in the lake about one hundred yards from the island shore. A number of small flocks were seen flying up the lake. April 23rd, a flock of fifty seen. May 8th, a flock of thirty in Ashbridges Bay.

AMERICAN GOLDEN-EYE.—January 15th, one seen flying up the lake. January 29th, one seen in the lake near Coatsworths Cut. March 6th, a flock of forty in Toronto Bay near the Eastern Gap. They remained in the vicinity for a week. April 10th, three in the lake close to shore.

BUFFLE-HEAD.—April 10th, a single female visited "Knock-

em Pond" and remained there a week. April 17th, a flock of six in Toronto Bay.

LONG-TAILED DUCK.—During the spring and fall migration the "Coween" is the common duck in Toronto Bay. Flocks of eight and nine hundred have frequently been seen. In the spring of 1910 very few were seen at Fishermans Island, but they were probably numerous in Toronto Bay. March 5th, a flock of four flew down the lake close to shore. March 6th, six mated birds flew across the beach at the Eastern Gap.

WHITE-WINGED SCOTER.—From April 13th until May 19th immense flocks flew over the island, flying up the lake half a mile from shore and crossing the island at a considerable elevation. None were observed alighting in the lake or the bay. June 19th, two seen flying up the lake.

CANADA GOOSE.—March 11th, a flock of twenty flying south over the island. March 19th, a flock of sixteen crossed the sandbar, flying in a northerly direction.

AMERICAN BITTERN.—A summer resident, the first record made on April 22nd.

LEAST BITTERN.—The first record made on May 12th. They were plentiful a few days later. One nest containing three eggs found on June 19th.

GREAT BLUE HERON.—One bird seen on April 15th and 22nd, and on May 10th. They are numerous in the late summer and remain all day in the marsh feeding in the lagoons.

VIRGINIA RAIL.—April 14th, five heard in the bog. From that date they were seen frequently all summer.

SORA RAIL.—April 10th, a single bird seen. They were numerous by April 14th. On June 12th a nest containing seven eggs was found concealed in a clump of coarse grass in a dry meadow at the edge of the bog.

FLORIDA GALLINULE.—May 7th, several heard. July 7th, a female with four young seen in "Knockem Pond."

AMERICAN COOT.—From April 1st to April 28th, four or five were seen daily in the lagoons, or flushed from the rushes at the water's edge. A single bird remained in "Knockem Pond" until June 1st.

KNOT.—June 5th, a flock of seven and three single birds seen on the lake shore.

LEAST SANDPIPER.—May 12th, a flock of seven seen. May 13th, one seen in company with a Piping Plover. May 19th, a flock of seven on the beach. A few were seen until May 26th but were never numerous.

(To be continued.)

MEETINGS OF THE BOTANICAL BRANCH.

February 25th, 1911, at the home of Mr. J. J. Carter. Meeting addressed by Dr. M. O. Malte, members present, besides the host and the speaker, Prof. John Macoun, Messrs. Whyte, G. H. Clark, W. T. Macoun, Attwood, Eastham, Newman, Sirett, Eddy and Groh.

Dr. Malte gave a short report of some of the results obtained when studying the grasses of the Geological Survey Herbarium. These results must be regarded as only preliminary, as a decisive knowledge of the Canadian grasses can only be obtained by studies in nature.

When beginning the study of the grasses, Dr. Malte realized the necessity of paying the most careful attention especially to the construction of the flowers and spikelets, these parts of the grass-plant being less variable than the vegetative characters and forming a safer basis for the exact judgment of the systematic value and relationship of the different forms. Especially when trying to make a natural system out of a polymorphous genus, the main groups, each of which contain a number of different species, will be found very easy and with more accuracy, if based upon essential flower characters. This was demonstrated in the genus *Panicum*.

In grouping the Canadian species of *Panicum*, about thirty in number, according to the construction of their spikelets, four main groups will be obtained. When comparing the different species of each of these groups, they all show the most striking correlation between flower-construction and general appearance. One type of spikelet is thus combined with a certain type of panicle and a special general character of the leaves; another type of spikelet corresponds to another type of panicle and another shape of the leaves, etc. The closer studying of the flowers has also been of important value for the distinct limiting of polymorphous species. In fact, the microscopical examination of the spikelets of different specimens of a polymorphous species has often shown, that what has been regarded as one species, in reality is a mixture of two or more species. The difficulty of recognizing these systematically independent species has often been due to the fact, that the descriptions, given by some grass-monographers, do not at all agree with the original descriptions of the species in question, and even are based upon more than one type, some characters having been picked up from one type, other characters from another. Such confusion of species will for instance, be found within the genus *Calamagrostis*.

The Greenlandian *C. hyperborea* Lge. is thus supposed to be widely spread all over Canada. In fact, no one of the Canadian

specimens, labelled *C. hyperborea* Lge. of the Geological Survey herbarium agrees with the Greenlandian plant. Most probably they belong to quite different species, no one of them being identical with *C. hyperborea* Lge. Similar things have been found regarding other *Calamagrostis* species.

The method followed when clearing out a species-skein was demonstrated in *Deschampsia cæspitosa* (L.) Beauv. This species is distributed all over Canada, presenting peculiar varieties especially in the Artic region, and on the west coast. By a comparative examination of the flowers of the continental *D. cæspitosa* specimens and those of Vancouver Island, the interesting observation was clearly made, that the latter ones differed in many essential points. There will be no doubt, that the Vancouver form will turn out to be a very good and distinct species. This new species, however, seemed at first to be very variable, showing varieties, which to a certain extent seemed to pass over to *D. elongata* Munro. These varieties have been called *D. cæspitosa* var. *longiflora*. The examination of the pollen of these doubtful specimens settled the whole matter. Their pollen is typical hybrid-pollen, that is, the pollen-grains are of very varying size and empty, no one of them being capable of fertilization. The comparative study of the hybrid and those *Deschampsia* species, occurring in Vancouver Island, has shown that the specimens in question are hybrids between *D. elongata* Munro and the above mentioned new species. The west-coast form of so-called *Deschampsia cæspitosa* consequently consists of one new species and the hybrid between this species and *D. elongata*.

Some specimens of *Alopecurus* were also demonstrated, and it was suggested that the native western species, which are called *A. geniculatus* and *A. aristulatus*, very likely may represent new species, quite different from the European species of the same name.

March 11th, 1911, at the home of Prof. John Macoun. Mr. L. H. Newman, who recently returned from Europe after nearly a year's absence, dealt with the subject, "The Composition of an old race of cereals and its variability", basing his remarks largely upon the present attitude of the experts of the famous plant breeding Institution at Svalöf, Sweden, where he had been studying.

In his opening remarks reference was made to the composite character of many old races. Many different forms were to be found within these races which by some were regarded as accidental mixtures, while others regarded them as the results of

variation. "Within recent years", continued the speaker, "a new light has been thrown on this question by the appearance of the theories of Mendel, DeVries and Johannsen. The basic principle of these theories is that an individual plant or animal is composed of distinct units which correspond in a sense to atoms in chemistry. By crossing two individuals a combination of units takes place which finds expression in a new form combining the characters of the two.

If the above theory of "Unit characters" is correct hereditary variation must take place in either of two ways, viz.—

(a) Through new combinations of characters by crossing, or

(b) By the sudden alteration in the unit constitution of the individual itself, a phenomenon to which the name "Mutation" has been applied.

This idea is clearly inimical to the old Darwinian belief in the omnipresence of hereditary variation at least in so far as it concerns those plants which naturally self-fertilize.

If we accept the idea that the various forms within an old race arise either as the result of natural crossing or by mutation, our next problem is to determine, if possible, how often these combinations and mutations take place, and which is of the more frequent occurrence.

DeVries, the real founder of the mutation theory, has classified mutations under two catagories, viz., *Retrogressive Mutation* and *Progressive Mutation*. The first owes its existence to the dropping out of a unit while the latter has arisen, according to DeVries, through the acquisition of a new unit. Despite all that has been said and written about the mutations theory and its great practical importance, the speaker had not found it very seriously considered in Europe. While there were evidences to show that so-called retrogressive mutations probably occur occasionally, yet he had not been able to find an unquestionable example of a progressive mutation. On the other hand the whole manner of thinking in the most progressive centres, such as Cambridge, England, (Bateson, Punnet, Wood, etc.), Copenhagen (Johannsen, Ravn, etc.), Berlin (Bauer), Austria (Tschermak), Sweden (Ehle and Tedin), and many other places was after the combinations idea. This idea has developed enormously during the past ten years following the extensive work which has been done in artificial cross fertilization, a work which provides a means of studying the unit constitution of the individual plant or animal and thus of throwing new light upon the great problems of heredity.

It has long been held by certain authorities that natural cross-fertilization among such supposedly self-fertilizing plants as wheat, oats, barley and peas was practically impossible. Re-

cent observations and conclusions of recognized authorities show, however, that this process takes place more often than is commonly supposed, although it is by no means frequent.

When one remembers Mendel's own annunciation, however, that it is only necessary to cross two individuals which differ in ten different characters in order to produce over 1,000 distinctly different hereditary forms, it will readily be seen how great may be the confusion (variation) which must follow within a population through the natural segregation of the heterogenous progeny in successive generations. This dividing up of the progeny of a crossing is now generally regarded as the variation which Darwin described but was unable to explain.

The speaker showed a large number of samples of oats from *Pure Lines* taken out of the old Probestier variety, the common white oats grown in the Baltic region. These samples were arranged to show the gradations in characters from one extreme to the other. Thus there was shown a gradation in *awniness* from an absolutely awnless sort to one which was heavily awned, the gradation between the two conditions being a very gradual one. Other lines out of the same variety were arranged to show the same gradations in size, shape and color of kernel.

A very large number of these pure lines from this variety have been worked with in Sweden and Denmark, the best sorts now in use in these countries having originated in this way. So great had been the multiplicity of distinct hereditary forms in this old variety that the experts in charge of the breeding operations found it difficult to obtain identical progeny from any two individuals. These different forms were *not regarded as mutations* but as the product of natural crossing. The experience in artificial crossing work had led Ehle, of Sweden, to state his conviction that a single crossing between two sorts possessing certain characters was quite sufficient to account for practically all the different forms now found in the above old variety.

STRANGE FORMS.—While the above forms can, without any stretch of the imagination, be regarded as being traceable to a common origin, other forms, more foreign in appearance, occur from time to time which seem more difficult to account for. Thus there may arise bearded heads of wheat in a bald sort, white kernelled individuals may appear in a black oat sort and vice versa, or they may appear in a red kernelled sort; side oats may appear in varieties which have branching panicles, etc.

The above aberrant forms have been called atavists by some, being regarded as the sudden reappearance of the character of an ancestor; others have applied the name mutation. Experience has shown, however, that the majority of these forms which appear in nature without any apparent preparation may

be produced artificially by crossing and may be accounted for not as mutations or atavists but as a natural consequence, following a combination of the units. Thus has this conception of unit characters revolutionized the whole manner of thinking and since it is happily capable of experimental proof it has served to place the great problem of the amelioration of races in an entirely new light.

March 25th, 1911, at the home of Mr. R. B. Whyte, members present sixteen. Mr. Whyte was the speaker, and gave an interesting account of a recent visit to Florida and Georgia, and the impressions gathered during two weeks observations. His observations were not confined to the botanical features of the country, but whether applying to the botany, the horticulture, the country itself, or its people, the impression which they almost uniformly gave was one of poverty. The soil, except in a few instances, which were referred to, supported very sparse crops or natural vegetation, being in places almost pure silica, and generally short of soil moisture. Among the few herbaceous plants growing wild were lupines and what was taken to be a magnolia, and the principal trees were cypress, magnolia, live oak and Georgia pine. Close grass turf such as we know is never seen, as the Bermuda grass which takes the place of our grasses there, grows always in tufts.

Of particular interest to a northern botanist were the cypress "knees" which are produced where these trees grow in water. Also the "black moss" or *Tillandsia* which festoons the branches of trees everywhere, and gives them a funereal aspect, which becomes very depressing. With regard to the Georgia or "long-leaf" pine, it was observed that its seedlings, unlike those of our white pine, were able to start freely without any protection or shading whatever.

Notwithstanding the poverty-stricken appearance of its agriculture, this part of the South is enjoying somewhat of a land boom. Large plantations of pecan nuts, and of oranges and grape fruits are being set out. Within recent years many superior varieties of pecans have been obtained, and their propagation promises to become an important source of revenue for the South.

Specimens of various varieties of pecan nuts were shown, as were also the *Tillandsia*, a seedling Georgia pine, and a sample of the sponges obtained in a large commercial way in the Gulf fisheries.

H.G.

BOOK NOTICE.

"PHYTOPATHOLOGY": Official Organ of the American Phytopathological Society. Volume I., No. 1, February, 1911. Published bi-monthly for the Society by Andrus & Church, Printers, Ithaca, N.Y.

Phytopathology, the pathology or study of diseases of plants, occupies a prominent position in the many Agricultural Experiment Stations in the United States. The Bureau of Plant Industry of the United States Department of Agriculture, at Washington, D.C., employs a large and efficient staff of specialists, devoting the whole of their time to the study of minute plant organisms causing disease in vegetation of all kinds, and also to the solution of the perplexing problems connected with the protection of plant life. Dr. Erwin F. Smith, who ranks among the most prominent members of the staff, is in charge of the Laboratory of Plant Pathology. His laboratory, which I have had the pleasure of visiting occasionally, is and deserves to be, because of its magnificent equipment, the basis of all plant pathological work of the Bureau of Plant Industry. It receives an appropriation of from $19,000 to $22,500 per annum of which nearly $15,000 is paid in salaries. Under his direction there are, besides the central laboratory, other laboratories devoted to the investigation of diseases of forest trees, grain, fodder, vegetable and other crops, each with separate endowments.

Nearly every State possesses its own Experiment Station, on the staff of which there are one or more plant pathologists of great activity. This activity manifests itself every year by the large amount of publications, in form of Bulletins and Annual Reports, of more or less important nature, distributed gratuitously throughout the different States. The Americans take far more interest in the progress of this comparatively new science, than may be boasted of elsewhere, probably with the exception of Germany—the home and birthplace of this discipline. The extent of their experiments in field and laboratory are truly American. One may say that to each experimental plant in Europe, there are a hundred, or more, in the United States.

In view of these facts it is only surprising that, with so large a body of trained men interested in the study of diseases, the birth of a society devoted to phytopathological interests, has not taken place sooner. It was my privilege to be present at the inaugural meeting of the new Phytopathological Society, held at Boston at the time of the meeting of the American Asso-

ciation, and to get an idea of the enthusiastic spirit of its many members distributed all over the United States. One may well realize the advantages of such an organization in a vast country like the United States, and the future prospects of this Society are very safe.

Hitherto, any matter concerning the study of plant diseases was brought before the Section of Botany at the Association's meetings, or was published in various periodicals, and remained duly undiscovered. Hence the Society is to be congratulated upon the publication of a journal, devoted entirely to Phytopathology, of which the first number made its appearance recently. Though primarly devoted to the dissemination of matter brought before the Society by its own members, the editorial board, very happily chosen, assisted by a number of Associate Editors from various parts of the States and including a representative from Canada, however, will aim to make the Journal more broadly representative, and there is no reason why this Journal should not succeed and be of great value not only as a national organ, but as a publication of much interest to investigators the world over, who will welcome a good resumè of the work done by our American friends.

It is proposed, for the present, to issue the Journal bimonthly. It has long been my hope to see a publication of this kind appear in the English language, equal to Sorauer's famous Zeitschrift in Germany.

Dr. Erwin Smith, besides his many attainments and a historian of no mean order, ushers the new Journal into the world by paying homage, in an opening biographical sketch, to Anton de Bary.

Anton de Bary "none more productive of important results" as the author states; "may this," he continues, "be indicative not only of the breadth and inclusiveness of the new Journal, but also of its standard of excellence." Truly a noble greeting! May this new born babe realize all anticipations!

The same author contributes another article with some excellent photographs on the results of his study of Crown Gall of plants. I intend to express my views on this interesting problem in another place and hence refer to the paper only by title.

Johnson, of the United States Department of Agriculture, deals with the important question of floret sterility in wheats. The author's observations deserve careful study. The conclusion reached may be summarized that the most important agents causing floret sterility (at San Antonio, Texas, at least) are rusts. As the rust spores, however, are frequently carried by small insects known as Thrips which were found in 1908 in at

least two-thirds of all sterile flowers examined, the prevention of this trouble is in my opinion primarily an entomological problem.

The present number contains seven contributions in all, besides a good review of Stephen & Hall's new book on "Diseases of Economic Plants," which, good as it is, is so peculiarly different from all other text-books by the unfortunate tendency of its authors to form the common names for nearly all described diseases from their generic names, by terminating them in "ose," "rose," or "nose:" (Vermiculariose! Cercosporose! Pseudomonose!)

H. T. G.

PORTRAIT OF THE LATE DR. JAMES FLETCHER.

The Fletcher Memorial Committee announce that the portrait of the late Dr. James Fletcher, which has been painted by Mr. Franklin Brownell, R.C.A., is now on exhibition, to members of the Ottawa Field-Naturalists' Club and their friends, at Wilson's Studio (upstairs), on Sparks Street. The likeness is a particularly good one, and will undoubtedly please all those who knew Dr. Fletcher. The Committee after paying all expenses in connection with the Memorial Fountain, had on hand a balance sufficient to allow of the above portrait being made. It will be hung in one of our public buildings where it will serve to remind us of one who did so much for the Club.

NESTING OF THE MOURNING WARBLER, LAVAL COUNTY, QUE.

My experience of the breeding habits of the Mourning Warbler is limited to three nests. On June 20th, 1908, while going through some woods of cedar and spruce, I observed a slight movement in a clump of ferns in a glade and immediately surmised it was a White-throated Sparrow leaving her nest. On following the bird up, however, I got a glimpse of a Mourning Warbler slipping through the underbrush. The bird, eventually, disappeared entirely and I never saw it again, although I remained in the locality for about half an hour. Upon returning to the spot where the bird was first disturbed, I found the nest nicely hidden five inches up in the centre of the bunch of ferns referred to and slightly resting on a mound covered with moss. It contained three fresh eggs about the size of those of the Yellow-throat, two which were marked at the larger end

with light reddish dots, the third egg having undershell scrawls and streaks. The nest, which is before me, is built externally with dead ferns, vegetable and vine stalks, skeleton leaves, and lined with black rootlets, a little moss, and horse hair. The same locality was visited on June 23rd, 1909, and I apparently ran across the same pair of birds again. After searching amongst the undergrowth for fifteen or twenty minutes the nest was located, about one foot up, in a raspberry bush and just over the tips of some ferns and other plants. The nest was constructed upon the same lines as the preceding one and the four fresh eggs were similarly marked. On July 17th, 1909, in some deep, mixed woods, another nest of this species, containing three newly hatched young and one addled egg, was found. This warbler, unlike the others, had chosen a very open wet spot, wherein grew rank grass and water-cress, and built her home about three inches up from the ground in the centre of a skunk cabbage. The remarks on the composition of the other two nests would apply to this one also, but it was quite a frail affair, the bird evidently depending upon the thickness of the leaves of the plant as a backing and as a possible protection from storms. It is hard to say why this bit of swampy ground was selected as a site for the nest, as there were many other more suitable places in the immediate vicinity.

W. J. BROWN, WESTMOUNT, QUE.

OBITUARY.

On Sunday morning, April 9th, the death occurred at Hamilton, Ont., of Miss Ruby B. McQuesten, after a long and trying illness, which she bore with great patience and cheerfulness. For many years during her residence in Ottawa, Miss McQuesten was a valued member of the Council of the Ottawa Field Naturalists' Club. She was a regular attendant at our lectures and field excursions and did much to interest the young ladies, under her charge, at the Ottawa Ladies' College, in the work of the Club. Her gentle, kindly disposition endeared her to all with whom she was associated. At a recent meeting of the Council of the Club, a special committee was appointed to extend to Mrs. McQuesten and her family, in their sad bereavement, the sincere sympathy of the members of the Council, and also that of all the Field-Naturalists who had the pleasure of her acquaintance.

THE OTTAWA NATURALIST

VOL. XXV. OTTAWA, JUNE, 1911 No. 3

SOME CANADIAN ANTENNARIAS.—IV.

By Edward L. Greene.

The collections of this genus made by Mr. James M. Macoun in the Hudson Bay region in the summer and autumn of 1910 having been submitted to me for determination, I find the specimens of such deep interest as to call for a detailed account of them, two out of the four numbers seeming to represent species hitherto unknown to science. Another illustrates a type first published by me some fourteen years ago, namely:

Antennaria angustata, Greene, Pittonia III., 284 (1898). The material on which this as a species was based came from the coast of Hudson Strait, where it had been collected by Dr. Bell, in 1884. It was obtained by Dr. Bell again in 1897 at two stations, both of them in Baffin Land, and these two collections are numbered 18744 and 18745 in the herbarium of the Geological Survey. Mr. Macoun, in 1910, found it at Port Burwell, Hudson Strait, the specimens having been gathered on July 18th; an early date for it, the stems little more than an inch high, though quite in flower. They bear the Geological Survey number 79271. The species holds in all the collections its characters of a narrow foliage, very narrow and acute involucral bracts, and these of a much darker color than those of any phase of *A. alpina*. The stems are also almost invariably monocephalous. There is a good representation of the species in specimens gathered in the northern extremity of Labrador by Mr. A. P. Low, July 21st, 1897; yet this is no great extension of its range, since it is a part of the Hudson Strait region; yet I see reason to apprehend that at least a part of the so-called *A. alpina* of Greenland may be referable to *A. angustata* rather, though the plant is larger, and the heads always several at the summit of the stem. There appears as yet no trace of the male plant of this species.

Antennaria isolepis sp. nov. Plant somewhat loosely cespitose, the matted leafy branches rather rigid and suffrutescent, the stolons or surculi of the season an inch long: leaves ½ inch long or somewhat more, oblanceolate, acute, not very firm, above thinly yet permanently tomentose, the indu-

ment denser and whiter beneath: flowering stems 5 inches high, very slender, rather conspicuously leafy; heads about 4 or 5 and pedicellate; involucres not small, broadly campanulate, of 3 or more series of bracts of almost equal length as to their strongly developed scarious part, this of a pale brown, oblong-oval, obtuse or merely acutish, delicately and almost fimbriately-serrate under a lens, in maturity more or less spreading.

Cape Eskimo, Hudson Bay, August 26th, 1910, J. M. Macoun, Geological Survey number 79270. I suspect that the plant here described is a male. The width, as well as the spreading character of the scarious part of the bracts would seem to indicate as much. Of the same import is the decidedly short pappus, which does not equal in length the involucre; but the pappus is capillary, without trace of dilatation at tip, and this fact militates against the supposition that the plant is a male; for, habitally at least, and also even by the characters of the involucre the species allies itself with that group of northern Rocky Mountain species of which *A. parviflora*, Nutt., and *A. umbrinella*, Rydb., are typical; and in all this group as far as known the male pappus is wide at tip. But, of whatever group, the species is a well marked new one.

ANTENNARIA NITENS sp. nov. Apparently densely matted, the crowded basal leaves on very short scarcely stalked offsets, less than ½ inch long, spatulately oblanceolate, acute, of a vivid green and altogether glabrous above, underneath sparsely silky-hairy, both faces polished and shining though also minutely puncticulate; stems slender, brownish and wiry, rigidly erect, sparsely scabrulous under a lens, otherwise glabrous, 2 to 4 inches high, bearing rather approximate and suberect oblong leaves and mostly a solitary head; involucres large for the plant, open campanulate, the bracts with but a trace of woolly hairs below the middle, their scarious tips of a dull brown, broadly ovate, acute, serrulate not as long as the chartaceous body of the bract; bristles of pappus firm, not dilated, but strongly barbellate from below the middle to near the summit.

Wager Inlet, an arm of the western part of Hudson Bay, latitude 65° 15′, collected by Mr. J. M. Macoun, September 8th, 1910, number 79269. The plants were quite past flowering at that date and had even shed most of their pappus, enough of which had remained, however, to show their very marked character of being almost plumose in the middle and upper portion. All the specimens seen by me are monocephalous except one, and that has two heads, the properly terminal one being far surpassed by the one lateral which is borne on a very slender pedicel. I can hardly doubt that the plants are all staminate. The

appearance of the involucres seem to indicate this, as well as the subplumose pappus.

Number 79268, also from Wager Inlet, and of the same date of September 8th, seems to represent another undescribed species, but one which can not be well described from the material. It is a gray-tomentose plant, and not by any vegetative characters to be distinguished from *A. angustata*, but the involucres are very widely different from those of that species or of *A. alpina*. The plant is not only past flowering, but all its achenes and pappus are gone. The bracts of the involucre, while not those of *A. isolepis*, yet show more likeness to them than to those of any other.

THE SPRING MIGRATION OF BIRDS AT FISHERMANS ISLAND, TORONTO, 1910.

By J. A. Munro.

(Continued from page 31).

Red-backed Sandpiper.—May 10th, one seen. They were plentiful from May 19th until May 31st, and a few remained until June 8th. The last record was made on June 18th when a single bird appeared in company with a Turnstone and a Semipalmated Sandpiper.

Semipalmated Sandpiper.—Plentiful from May 27th until June 7th. A few remained until June 18th.

Sanderling.—A few seen between May 20th and 29th. They became plentiful on May 30th when flocks of fifty and sixty appeared and remained on the beach until June 5th.

Greater Yellowlegs.—A few single birds seen from April 14th until May 20th.

Yellowlegs.—A single bird seen on April 19th and May 16th. The first fall record made on June 17th.

Spotted Sandpiper.—The first record made on May 1st. They were numerous a week later and commenced nesting about May 27th. Eleven nests containing eggs were found from May 27th to July 8th.

Hudsonian Curlew.—The flight took place on May 24th, 25th and 26th. A single bird remained until June 2nd, feeding along the edge of the "Beach Pond". On June 5th two birds were seen flying down the lake against a strong east wind. A careful record was kept of the flight of which the following data is the result: May 24th, 6.30 a.m., a flock of twelve came in from the lake, circled the beach several times and then flew down the lake; 7.30 a.m., sixteen flew down the lake close to shore; 8.00

a.m., a flock of twelve alighted on the beach for a few minutes and then flew north; 8.10 a.m., a flock of forty-eight came in from the lake and remained until 11 a.m., flying up and down the beach. Several times they alighted on the sandbar beside the Herring Gulls, who repeatedly drove them away; 10.20 a.m., two flew up the beach; 11.20 a.m., a flock of 500 crossed the beach flying in a north-westerly direction, sometimes in a long straggling line and again closing up into a compact flock; between 11.30 and 11.40 a flock of ten, one of five and one of six flew over; 11.40 a.m., a flock of seven crossed the beach; 11.50 a.m., a flock of forty alighted on the beach and remained in the vicinity until 2.30 p.m. No more were seen until 7.30 p.m., when a flock of thirty flew over. May 25th, 8.45 a.m., a flock of eleven crossed the beach; 4.30 p.m., a flock of twenty-three alighted on the beach beside the Herring Gulls. May 26th, 1.00 p.m., a long line about 300 in all crossed the beach. Another flock of twenty followed close behind.

BLACK-BELLIED PLOVER.—Single birds and flocks of three and four seen from May 7th until June 16th. They were observed more frequently between May 24th and June 5th.

KILLDEER.—The first record made on March 19th. They breed on the city dump north of the sandbar.

SEMIPALMATED PLOVER.—A few seen between May 21st and June 8th in flocks of five and six and generally accompanied by Semipalmated Sandpipers.

BELTED PIPING PLOVER.—One seen on April 22nd, May 5th and 8th. Three pairs arrived on May 10th and began nesting a few days later. One set of eggs was found on May 29th. They were laid on the open pebbly beach without any attempt at concealment. The eggs harmonized perfectly with the neutral colored sand and gravel and were very hard to locate.

RUDDY TURNSTONE.—The first record made on May 10th. Only a few stragglers were seen until May 27th, when flocks of twenty to forty began to arrive. The flight lasted until June 8th The last record was taken on June 19th, when a single bird was seen.

MARSH HAWK.—Single birds seen from March 20th to May 8th.

SHARP-SHINNED HAWK.—April 28th, one flew down the beach.

PIGEON HAWK.—One seen on the north shore of Ashbridges Bay.

SPARROW HAWK.—March 20th, one seen. May 16th, one seen.

BELTED KINGFISHER.—First record made on April 1st A common summer resident.

SHORT-EARED OWL.—A single bird remained in the marsh from April 10th to May 13th and helped to thin the ranks of the small migrants.

SNOWY OWL.—January 4th, one seen standing on an ice hummock in Toronto Bay. January 8th, one seen. March 1st, one seen standing on a muskrat house in the marsh. This bird remained in the vicinity until April 6th. On April 2nd it was accompanied by a darker plumaged bird.

DOWNY WOODPECKER.—April 20th, one seen.

YELLOW-BELLIED WOODPECKER.—One in the willows by the breakwater.

RED-HEADED WOODPECKER.—One flew over the beach

FLICKER.—Common summer resident. First record made on March 24th.

WHIP-POOR-WILL.—May 24th, one heard in the willows by the breakwater, the first record taken at Fishermans Island in many years.

NIGHTHAWK.—June 3rd, numerous, flying over the marsh, in the dusk.

CHIMNEY SWIFT.—May 16th, one seen; May 19th, numerous, flying up and down the beach in company with countless swallows.

KINGBIRD.—First arrival noted on May 23rd. A pair nested in one of the tall willows near the breakwater.

PHŒBE.—April 1st, one seen in the willows.

WOOD PEWEE.—June 6th, one seen in the willows.

LEAST FLYCATCHER.—A few seen between May 16th and 23rd.

PRAIRIE HORNED LARK.—A common resident, breeds on the main island. February 20th, two seen. A young bird fully feathered was collected on May 19th.

AMERICAN CROW.—Five or six visited the island every morning during the summer in search of stranded Suckers or Gaspereau.

BOBOLINK.—Numerous from May 16th to 19th.

COWBIRD.—March 31st, a flock of ten flew over the marsh. April 2nd, a flock of twenty and a flock of eight crossed the beach.

RED-WINGED BLACKBIRD.—A single bird seen on February 28th. A flock of eleven arrived on March 11th and a few were seen daily until March 26th, when they became numerous. The first nest, containing three eggs and two newly-hatched young, was found on May 15th. Between May 15th and June 10th twelve nests were found. On May 24th, four young, well able to fly, were seen.

MEADOWLARK.—March 29th, two seen; March 31st, one seen.

BALTIMORE ORIOLE.—May 21st, one seen in the willows. A pair nested in the willows by the breakwater.

BRONZED GRACKLE.—May 20th a pair flew over the marsh. June 18th, three broods of young, feeding at the edge of the marsh.

SNOWFLAKE.—January 19th, a single bird on the beach. February 20th, a flock of thirty seen.

VESPER SPARROW.—Three seen on April 3rd. They were numerous from April 10th to 16th; a pair seen on May 1st.

SAVANNAH SPARROW.—May 15th, two seen; May 16th, fifteen seen in company with a large flock of White-throats and White-crowns. A few were seen until May 19th. They breed on the main island but no records were made of them breeding on Fishermans Island.

WHITE-CROWNED SPARROW.—One seen on April 26th; numerous from May 8th to 22nd.

WHITE-THROATED SPARROW.—April 16th, five seen. Small flocks appeared on the beach from April 26th to May 15th. On May 16th and 17th, there was a large flight, three or four hundred were seen. A single bird remained until May 22nd.

CHIPPING SPARROW.—May 7th, four seen.

SLATE-COLORED JUNCO.—Small flocks seen from March 28th to May 16th.

SONG SPARROW.—March 9th, three seen. By March 24th they were numerous. The first nest with eggs was found on May 12th.

SWAMP SPARROW—April 12th, two seen. Numerous on April 15th. One nest containing egg shells was found on the ground in a dry meadow close to the marsh.

FOX SPARROW.—A single bird seen from April 1st to 5th. On April 6th there was a flock of six, scratching among the dead leaves under the willows. Single birds were seen on April 7th, 15th and 29th.

TOWHEE.—Single birds seen frequently from April 1st to May 9th.

ROSE-BREASTED GROSBEAK.—May 15th, one male seen.

SCARLET TANAGER.—One male seen from May 25th to 28th.

PURPLE MARTIN.—Two pairs arrived on April 18th. They nested in a bird house beside one of the cottages.

CLIFF SWALLOW.—April 25th, six seen flying over the marsh. May 19th, a stiff north-west gale was blowing and large flocks of Cliff, Bank and Barn Swallows were huddled together on the sand in the lee of the breakwater.

BARN SWALLOW.—April 22nd, ten seen flying over the marsh; numerous on April 26th. A large flight took place on May 27th.

TREE SWALLOW.—A single bird seen from April 5th to 13th. A flock of seven arrived on April 14th. A bird box was placed on the verandah of one of the cottages and on May 4th a pair started nest building. The work was carried on in a desultory fashion and the nest was not completed until May 21st. It was a loose bundle of hay with a deep cavity in one corner, well lined with white hen feathers. The first egg was laid on May 25th and one was laid daily until May 30th. The nest and eggs were taken and the birds began immediately to build another. The second nest was identical in appearance with the first and was completed on June 7th. By June 14th the complement of eggs was laid; June 26th, four eggs were hatched and the remaining two on the following day. July 8th, the young were almost full fledged and had left the feather-lined cavity and were huddled together in a corner of the box. The nest was as clean as before the eggs were laid.

BANK SWALLOW.—April 22nd, a great number were flying over the marsh.

CEDAR WAXWING.—Four were seen perched on the telephone wires beside the breakwater, on June 29th.

NORTHERN SHRIKE.—March 5th, one was seen hunting house sparrows in the willows. He imitated the robin's call and the chatter of a house sparrow quite distinctly.

MIGRANT SHRIKE.—March 29th, one seen in the willows.

BLACK AND WHITE WARBLER.—May 7th, five seen.

YELLOW WARBLER.—First record on May 16th. A nest containing five eggs was found in the willows on June 4th.

MYRTLE WARBLER.—May 5th, one seen; May 7th, seven seen; May 22nd, one seen.

MAGNOLIA WARBLER.—One seen on May 21st and 23rd.

CHESTNUT-SIDED WARBLER.—One seen on May 21st and 22nd.

BAY-BREASTED WARBLER.—One seen in the willows on May 22nd.

BLACKBURNIAN WARBLER.—One seen on May 20th and 24th.

BLACK-THROATED GREEN WARBLER.—May 7th, one seen.

PALM WARBLER.—Two seen in the low willows on the beach.

OVEN BIRD.—One seen from May 16th to 22nd.

NORTHERN YELLOW THROAT.—A few single birds seen from May 8th to 23rd.

CANADIAN WARBLER.—May 26th, one seen.

AMERICAN REDSTART.—Two seen on May 21st and 22nd.

CATBIRD.—May 21st, one seen.

BROWN THRASHER.—One arrived on May 2nd, and remained in the willows on the beach until May 16th.

HOUSE WREN.—April 16th, one seen. A pair seen on May 13th were probably nesting.

LONG-BILLED MARSH WREN.—First record taken on April 30th. They were not numerous until May 11th. Several new nests were found on May 15th, but none were found containing eggs until May 29th.

BROWN CREEPER.—One seen on April 7th and 10th.

GOLDEN-CROWNED KINGLET.—April 7th, one seen; April 15th, a flock of about thirty-five was in the willows.

RUBY-CROWNED KINGLET.—April 30th, two seen in the willows. On May 7th, a flock of twelve arrived and remained two days. May 19th, one seen.

WOOD THRUSH.—May 8th, two seen on the beach. May 16th, two were seen in the willows.

WILSON'S THRUSH.—There were two flights, the first between April 26th and 30th and the second on May 21st and 22nd.

HERMIT THRUSH.—May 7th, two seen; May 22nd, one seen.

AMERICAN ROBIN.—March 24th, two seen. They were numerous in the city a week earlier. The first nest with eggs was found on May 7th.

BLUEBIRD.—April 5th, a pair seen.

COLEOPTERA COLLECTED IN NORTHERN ONTARIO.

BY H. A. AND H. W. WENZEL, PHILADELPHIA, PA.

The following list of species were collected, by the writers, under somewhat unfavorable conditions; a great deal of rain made collecting difficult, especially among the conifers.

The districts visited were: North Bay on Lake Nipissing, a district not favorable for collecting on account of vicinity having been cleared of all timber; Callander, a few miles south on above lake, which has a growth of small pines and other conifers with the usual growth of birches (a good district, especially for Buprestidæ); Scotia Junction and vicinity, which is of interest owing to a variable flora found there and which should give good results at the proper season; Huntsville, and the portage on Lake of Bays. The district back of the steamer landing, North Portage, if collected at the right season, should yield some interesting material. The flora is very variable and of a luxurious growth, more so than at any other place visited.

The data are as follows: North Bay, July 18th; Callander, July 19th and 20th; Scotia Junction, July 21st to 25th, July 28th to 30; Huntsville, July 26th and 27th. C.=Callander; S. Jc.=Scotia Junction; H.=Huntsville.

CICINDELIDÆ.

Cicindela vulgaris Say.....S. Jc.
" 12-*guttata* Dej.....S. Jc.

CARABIDÆ.

Bembidium nitidum Dej.....S. Jc.
" *carinula* Chd.....S. Jc.
" *nigrum* Say.....S. Jc.
" *ustulatum* Linn.....S. Jc.
" *variegatum* Say.....S. Jc.
" *quadrimaculatum* Linn.....S. Jc.
Patrobus longicornis Say.....S. Jc.
Pterostichus adoxus Say.....H.
Amara arenaria Lec. (?).....S. Jc.
" *pallipes* Kirby.....S. Jc.
" *apricarius* Payk.....S. Jc.
" *impuncticollis* Say.....S. Jc.
" *obesa* Say.....S. Jc.
Calathus impunctata Say.....S. Jc.
Platynus sinuatus Dej.....S. Jc.
" *atratus* Lec.....S. Jc.
" *fraterculus* Lec.....S. Jc.
" *metallescens* Lec.....S. Jc.
" *cupripennis* Say.....S. Jc.
" *placidus* Say.....S. Jc.
" *obsoletus* Say.....S. Jc.. H.
" *ruficornis* Lec.....H.
Metabletus americanus Dej.....S. Jc.
Pinacodera platicollis Say.....S. Jc.
Cymindis unicolor Kirby.....S. Jc.
" *borealis* Lec.....S. Jc.
Chlænius sericeus Forst.....S. Jc.
Harpalus herbivagus Say.....S. Jc.
" *rufimanus* Lec.....S. Jc.
Stenolophus conjunctus Say.....S. Jc.

HALIPLIDÆ.

Haliplus cribrarius Lec.....S. Jc.
" *ruficollis* De G.....S. Jc.
" *longulus* Lec.....S. Jc.

DYTISCIDÆ.

Bidessus lacustris Say.....S. Jc.
Coelambus inæqualis Fab.....S. Jc.
" *dissimilis* Harr.....S. Jc.
Hydroporus undulatus Say.....S. Jc.
" *tristis* Payk.....S. Jc.
" *striatopunctatus* Melsh.....S. Jc.
" *difformis* Lec.....S. Jc.
" *modestus* Aubé.....S. Jc.
" sp.....S. Jc.
" sp.....S. Jc
Ilybius pleuriticus Lec.....C., S. Jc.
" *angustior* Gyll.....C., S. Jc.
" *discedens* Sharp.....C., S. Jc.
Agabus semipunctatus Kirby.....S. Jc.
" *anthracina* Mann.....C., S. Jc.
" *morosus* Lec. (?).....S. Jc.
" *reticulata* Kirby.....S. Jc.
" *erichsoni* G. & H.....S. Jc.
" *gagatus* Aubé.....S. Jc.
" *confinis* Gyll.....S. Jc.
" sp.....S. Jc.
Rhantus binotatus Harr.....C., S. Jc.
Colymbetes sculptilis Harr.....C., S. Jc.
Hydaticus stagnalis Fab.....S. Jc.
Dytiscus sp. (female).....S. Jc.
Acilius fraternus Harr.....C., S. Jc.
" *mediatus* Say.....C., S. Jc.

GYRINIDÆ.

Gyrinus borealis Aubé.....C.
" *picipes* Aubé.....C., S. Jc.
" sp.....C.

HYDROPHILIDÆ.

Helophorus inquinatus Mann.....S. Jc.
Hydrochus squamifer Lec.....S. Jc.
Hydrophilus mixtus Lec.....S. Jc.
Hydrocharis obtusatus Say.....S. Jc.
Berosus striatus Say.....S. Jc.
Philhydrus hamiltoni Horn.....S. Jc.
Helochares lacustris Lec.....S. Jc.
" *fimbriatus* Melsh.....S. Jc.
Helocombus bifidus Lec.....C.
Creniphilus digestus Lec.....S. Jc.
" *subcupreus* Say.....S. Jc.
Cercyon hæmorrhoidalis Fab.....S. Jc.

STAPHYLINIDÆ.

Aleochara bimaculata Grav.....S. Jc.
Quedius peregrinus Grav.....S. Jc.
Staphylinus violaceus Grav.....S. Jc.
Stenus croceatus Casey.....S. Jc.
Tachyporus chrysomelinus Linn.....S. Jc.

CORYLOPHIDÆ.

Sacium obscurum Lec.....S. Jc.
Stilbus sp.....S. Jc.

COCCINELLIDÆ.

Anisosticta strigata Thunb.....S. Jc.
Hippodamia 13-punctata Linn.....S. Jc.
" *parenthesis* Say.....S. Jc.
Coccinella trifasciata Linn.....S. Jc., H.
" *9-notata* Hbst.....S. Jc., H.
" *transversoguttata* Fab.....S. Jc., H.
" *monticola* Muls.....S. Jc., H.
Adalia frigida Schn.....S. Jc., H.
" *bipunctata* Linn.....C., S. J., H.
Harmonia hudsonica Cas. (?).....S. Jc., H.
Anatis ocellata Linn.....S. Jc.
Hyperaspis bigeminata Rand.....S. Jc.
" *undulata* Say.....S. Jc., H.

COLYDIIDÆ.

Cerylon castaneum Say.....S. Jc.

CUCUJIDÆ.

Pediacus fuscus Er.....H.

CRYPTOPHAGIDÆ.

Antherophagus convexulus Lec.....S. Jc.
Henobicus serratus Gyll.....H.
" sp.....H.

DERMESTIDÆ.

Anthrenus musæorum Linn.....S. Jc.

HISTERIDÆ.

Hister depurator Say.....S. Jc.
" *abreviatus* Fab.....S. Jc.
" *sedecemstriatus* Say.....S. Jc.
Saprinus distinguenotus Mars.....S. Jc.

NITIDULIDÆ.

Epurea truncatella Mann.....S. Jc.

LATRIDIIDÆ.

Corticaria dentiger Lec.....S. Jc.
" *villosa* Zimm.....S. Jc.
Melanophthalma distinguenda Com.....H.

DASCYLLIDÆ.

Prionocyphon discoideus Say.....S. Jc.
Scirtes tibialis Guer.....S. Jc.
Cyphon ruficollis Say.....S. Jc.
" *variabilis* Thunb.....S. Jc.
" *padi* Linn.....S. Jc.

ELATERIDÆ.

Deltometopus amœnicornis Say.....C., S. Jc., H.
Dromæolus cylindricollis Say.....C.
Adelocera obtecta Say. (?).....C.
" *aurorata* Lec.....C.
Cardiophorus sp.....C.
Cryptohypnus nocturnus Esch.....S. Jc.
Elater pedalis Germ.....C., S. Jc.
" *mixtus* Hbst.....S. Jc.
" *pullus* Lec.....C., S. Jc.
" *luctuosus* Lec.....C., H.
" *rubricus* Say.....S. Jc.
Megapenthus stigmosus Lec.....C., H.
Agriotes limosus Lec.....S. Jc.
Dolopius lateralis Esch.....S. Jc., H.
Melanotus sp.....C.
Limonius æger Lec.....C.
Athous brightwelli Kirby.....H.
Corymbites triundulatus Rand.....C., S. Jc., H.
" *propola* Lec.....C.
" *hieroglyphicus* Say.....S. Jc.
" *nigricornis* Panz.....S. Jc.

BUPRESTIDÆ.

Dicerca prolongata Lec.....C.
" *caudata* Lec.....C.
" *tenebrosa* Kirby.....C.
" *lugubris* Lec.....C.
Poecilonota cyanipes Say.....C.
Buprestis maculiventris Say.....C., S. Jc.
" *fasciatus* Fab.....H.
" *sulcicollis* Lec.....C.
Melanophila longipes Say.....H., C., S. Jc.
Chrysobothris trinervia Kirby.....C.

Chrysobothris scabripennis Lap. & Gory.....C., S. Jc.
" *pusilla* Lap. & Gory.....C.
Agrilus otiosus Say.....H.
" *anxius* Gory.....C.
" *politus* Say.....H.

LAMPYRIDÆ.

Caenia dimidiata Fab.....S. Jc.
Pyractomena angulata Say.....S. Jc.
Photuris pennsylvanica De G.....S. Jc.
Eros canaliculatus Say.....H., C., S. Jc.
" sp.....C.
Podabrus diadema Fab.....C.
" sp.....C.
Telephorus fraxini Say.....H., S. Jc.
" *rotundicollis* Say.....C.
" *rectus* Melsh.....H., S. Jc.
" *scitulus* Say.....H., S. Jc.
Lucidota atra Fab.....S. Jc.

MALACHIDÆ.

Collops tricolor Say.....S. Jc.
" *vittatus* Say.....S. Jc.

CLERIDÆ.

Trichodes nuttali Kirby.....C., H., S. Jc.
Hydnocera pallipennis Say.....S. Jc.

PTINIDÆ.

Petalium seriatum Fall.....H.
Dorcatoma dresdensis Herbst.....S. Jc.

SCARABAEIDÆ.

Onthophagus hecate Panz.....C., S. Jc., H.
Aphodius fossor Linn.....H.
" *fimetarius* Linn.....S. Jc.
" *ruricola* Melsh.....S. Jc., H.
" *granarius* Linn.....S. Jc., H.
" *vittatus* Say.....S. Jc., H.
" *lentus* Horn.....S. Jc.
" *leopardus* Horn.....S. Jc.
Dichelonycha elongata Fab.....C.
" *subvittata* Lec.....H.
Trichius piger Fab.....S. Jc.

CERAMBYCIDÆ.

Tragosoma harrisii Lec.....C.
Asemum atrum Esch.....C.

Clytanthus ruricola Oliv. ..... C., S., Jc.
Typocerus sparsus Lec. ..... C.
" *velutinus* Oliv. ..... S. Jc.
Leptura subhamata Rand. ..... S. Jc.
" *nigrella* Say ..... S. Jc.
" *canadensis* Fab. ..... S. Jc.
" *vagans* Oliv. ..... S. Jc.
" *chrysocoma* Kirby ..... S. Jc.
" *proxima* Say ..... S. Jc.
" *vittata* Germ. ..... S. Jc.
Monohammus scutellatus Say ..... C.
Graphisurus pusillus Kirby ..... C.
Pogonocherus mixtus Hald. ..... C.
" *penicellatus* Lec. ..... C.
Saperda mœsta Lec. ..... C.
Acmæops proteus Kirby ..... C.
" *pratensis* Laich. ..... C.

CHRYSOMELIDÆ.

Zeugophora varians Cr. ..... C.
Bassareus mammifer var. *sellatus* Suffr. ..... S. Jc.
Cryptocephalus quadruplex Newm. ..... S. Jc.
Monachus saponatus Fab. ..... S. Jc.
Diachus auratus Fab. ..... S. Jc.
Pachybrachys atomarius Melsh. ..... S. Jc.
" *hepaticus* Melsh. ..... S. Jc.
Adoxus obscurus var. *vitis* Linn. ..... C.
Phyllodecta vulgatissima Linn. ..... C.
Galerucella tuberculata Say ..... H.
Haltica bimarginatus Say ..... S. Jc.
Crepidodera helxines Linn. ..... H.
Systena frontalis Fab. ..... S. Jc.
Odontota rubra Web. ..... S. Jc.
Charistena nigrita Oliv. ..... C.
Chrysochus auratus Fab. ..... S. Jc.
Chrysomela bigsbyana Kirby ..... H.

TENEBRIONIDÆ.

Blapstinus metallicus Fab. ..... H.

CISTELIDÆ.

Hymenorus niger Melsh. ..... C., H., S. Jc.
Isomira sp. ..... C., H., S. Jc.
Androchirus erythropus Kirby ..... S. Jc.

LAGRIIDÆ.

Arthromacra ænea Say ..... H.

MELANDRYIDÆ.

Synchroa punctata Newm. ..... C.
Scotochroa basalis Lec. ..... C., H., S. Jc.
Serropalpus barbatus Schall. ..... S. Jc.
Symphora rugosa Hald. ..... C.
Canifa plagiata Melsh. ..... H.
" *pusilla* Hald. ..... H.

PYTHIDÆ.

Salpingus virescens Lec. ..... C., H., S. Jc.

MORDELLIDÆ.

Anaspis rufa Say. ..... S. Jc.
Mordella metæna Germ. ..... S. Jc.
" *marginata* Melsh. ..... S. Jc.
" *lunulata* Helm. ..... S. Jc.
Mordellistena pityptera Lec. ..... S. Jc.

ANTHICIDÆ.

Notoxus anchora Hentz. ..... S. Jc.

PYROCHROIDÆ.

Dendroides canadensis Lat. ..... C.
" *concolor* Newm. ..... C.

MELOIDÆ.

Macrobasis unicolor Kirby. ..... S. Jc.

RHYNCHITIDÆ.

Rhynchites cyanellus Lec. ..... H.

OTIORHYNCHIDÆ.

Otiorhynchus ovatus Linn. ..... S. Jc.

CURCULIONIDÆ.

Apion walshii Smith. ..... S. Jc., H.
Phytonomus nigrirostris Fab. ..... C.
Lepyrus colon Linn. ..... C.
Macrops sp. ..... C., S. Jc.
Pissodes strobi Peck. ..... C.
" *affinis* Rand. ..... C.
" *dubius* Rand. ..... S. Jc.
" sp. ..... C., S. Jc.
Hylobius confusus Kirby. ..... C.
Hypomolyx pineti Fab. ..... H., S. Jc.
Dorytomus laticollis Lec. ..... C.
" *brevicollis* Lec. ..... C.

Magdalis lecontei Horn.....C.
" *barbita* Say.....S. Jc.
" *hispoides* Lec.....S. Jc., H.
" *inconspicua* Horn.....H.
" *pallida* Say.....C.
" sp.....S. Jc.
Anthonomus scutellatus Gyll.....C.
" *signatus* Say.....H.
" *corvulus* Lec.....C.
Orchestes pallicornis Say.....C.
" *parvicollis* Lec.....C.
" *niger* Horn.....H.
" *ephippiatus* Say.....C.
Elleschus bipunctatus Linn.....H.
Encalus decepiens Lec.....C.
Acanthoselles acephalus Say.....S. Jc.
" *epilobii* Payk.....S. Jc.
Rhinoncus pyrrhopus Lec.....S. Jc.
Limnobaris rectirostris Lec.....C.
Balaninus obtusus Blanch.....H.

CALANDRIDÆ.

Rhyncholus sp.....S. Jc.

SCOLYTIDÆ.

Gnathotrichus materiarius Fitch.....C.
Pityophthorus cariniceps Lec.....C., S. Jc.
" sp.....S. Jc.
Xyloterus bineatus Oliv.....C.
Xylocleptes decepiens Lec.....C.
Tomicus caelatus Eich.....C.
" *pini* Say.....C.
Dryocoetes septentrionis Mann.....S. Jc.
Scolytus sp.....C.
Polygraphus rufipennis Kirby.....S. Jc.
Phloeosinus sp.....S. Jc.
Hylurgops glabratus Zett.....C.

ANTHRIBIDÆ.

Hormiscus saltator Lec.....S. Jc.

SUBSCRIPTIONS 1911-1912.

As there are a number of subscriptions for the current club year still unpaid, the Treasurer, Mr. W. T. Macoun, Central Experimental Farm, requests that these members who have not yet sent their fee, should do so as soon as possible.

THE OTTAWA NATURALIST

VOL. XXV. OTTAWA, JULY, 1911 No.

CHANGES IN THE STATUS OF CERTAIN BIRDS IN THE VICINITY OF MONTREAL, P.Q.

By L. McI. Terrill, Westmount, Que.

The following notes refer to the local abundance of certain birds that are gradually extending their breeding range in a north-easterly direction, and to other species, that, as summer residents, have either disappeared, or are fast disappearing from this vicinity.

To emphasize this I have made a comparison of the present standing of these species, with that of fifteen years ago, and have quoted from Mr. E. D. Wintle's list of Montreal birds, published in 1896—such quotations being marked with asterisks.

I have also made notes on other species of breeding birds, listed by Mr. Wintle, as doubtful or rare summer residents.

Nycticorax nævius, Black-crowned Night Heron.

"Summer resident; common. Breeds on islands in Lachine Rapids."*

These birds have forsaken their former nesting grounds but still breed in large numbers in the flooded ash swamps bordering on the Lake of Two Mountains. In two heronries visited on May 24th, 1908 and 1909, there were several hundred pairs nesting.

Actitis macularia, Spotted Sandpiper.

"Summer resident; abundant."*

Having seen no mention of gregarious habits attributed to this Sandpiper, it might be of interest to note that a few years ago a large colony were nesting on Isle Ronde (a small island of a few acres, opposite the city). Visiting this island on May 26th, 1896, I located without difficulty thirteen occupied nests. Again, on May 31st, 1898, I examined upwards of twenty-five. On each occasion only a small portion of the island was examined and I estimated that there were well over one hundred pairs breeding.

Accipiter velox, Sharp-shinned Hawk.

"Transient visitant; common."*

I have found this Accipiter a much more common summer resident than formerly suspected. I have read of the harsh scream of this bird, but to me it sounds very subdued for a hawk, and suggests more the cackling notes of the Kingfisher or Arctic Three-toed Woodpecker. What few vocal powers it possesses are seldom voiced, and to make matters more difficult it rarely ventures from the seclusion of dense coniferous growths and adjacent sphagnum bogs. The Marsh Hawk is often a close neighbor, nesting amongst the small growth of the bog, and both find the latter a congenial hunting ground. The Sharp-shinned Hawk is not averse to a neighboring farm-yard, as the loud-voiced "buteo" in the nearby woods, takes blame for any missing poultry.

ACCIPITER COOPERI, Cooper's Hawk.

"Transient visitant; scarce."*

I know of only one instance of this hawk breeding in the district. This has been noted by Mr. W. J. Brown in the OTTAWA NATURALIST.[1]

ASIO WILSONIANUS, Long-eared Owl.

"Transient visitant; scarce."*

This species, like the Sharp-shinned Hawk, might easily escape notice, as a summer resident, by reason of its retiring habits, and the fact that it is a very close sitter and not easily disturbed from the nest. I have found it to be a fairly well distributed summer resident, throughout the district, wherever cedar groves occur.

OTUS ASIO, Screech Owl.

"Winter visitant; scarce."*

I know of two instances of this Owl's occurrence here, in the summer: June 25th, 1910, I came across a family of young and adults in a cedar swamp. These birds all had grayish plumage and were in the same locality on July 1st and 6th; September 12th, 1908, I secured a bird in the red phase of plumage.

BUBO VIRGINIANUS, Great Horned Owl.

"Permanent resident; common."*

Much less common than formerly and I should class it as a rare resident.

ANTROSTOMUS VOCIFEROUS, Whip-poor-will.

"Transient visitant; scarce."*

I have found this species common throughout the Caugh-

[1] Ottawa Naturalist, July, 1908.

nawaga Indian reserve; scarce elsewhere in the district, though common to the north in the Laurentian Hills. An almost unbroken stretch of small second-growth covers the rolling land of the Caughnawaga reserve, with occasional prominent sugar groves on the uplands and marshes in the lowlands. Whilst passing through this district on May 16th, 1909, I heard the notes of this species just before dark—about 7.45 p.m.—coming from several directions, and on other occasions, throughout the summer, have surprised individuals into noiseless flight.

EMPIDONAX TRAILLI ALNORUMS, Alder Flycatcher.

"Summer resident; scarce."*

During the past fifteen years I have found this Flycatcher more abundant than any other of the family. Frequently I have found two or three pairs nesting quite closely to one another, and on July 1st, 1910, in a favorable second-growth patch, I counted three occupied nests and another in course of construction, all within a radius of fifty yards.

OTOCORIS ALPESTRIS PRATICOLA, Prairie Horned Lark.

"Summer resident; common."*

This species has been steadily on the increase and I should call it an abundant summer resident.

CYANOCITTA CRISTATA, Blue Jay.

"Transient visitant; common."*

The Blue Jay is a very quiet bird, in this district, during the breeding season, and I have only found it nesting in a few restricted localities.

STURNELLA MAGNA, Meadowlark.

"Summer resident; scarce."*

Mr. Wintle records only one bird for the district, shot at Laprairie, seven miles from Montreal, on the 10th of October, 1891. Six years later I saw one at Cote St. Luc, three miles from the city. Absence from Montreal during the greater part of four years (1899-1902) leaves a possible blank in my records; but again, in 1904, I saw a flock of twelve at Cote St. Luc on September 25th, and another flock at Cote St. Paul, two miles from the city, on October 9th. In the spring of 1905 (April 20th) they were fairly well distributed throughout the neighborhood of Cote St. Luc, and on June 9th of the same year, an occupied nest was found at Cote St. Paul. Since this latter date it has become yearly more numerous and to-day is a common, if not an abundant, summer resident.

JUNCO HYEMALIS, Slate-colored Junco.

"Summer resident; abundant. Breeds in Mount Royal Park."*

I have never found the Junco, during the breeding season, in the vicinity of Montreal. No doubt in years gone by it nested on Mount Royal, as they still do, to some extent, on the slopes of neighboring isolated mountains, such as Belœil, Yamaska and Oka. They are common twenty-eight miles to the north, in the Laurentians, but give a wide berth to the low-lying country between Montreal and Farnham. After passing Farnham they become evident again and are abundant at Sherbrooke.

ZAMELODIA LADOVICIANA, Rose-breasted Grosbeak.

"Transient visitant; common."*

On July 10th, 1896, I saw a male bird at Cote St. Luc. It was uttering its metallic alarm notes at the time and likely the female had young in the vicinity. On June 22nd, 1897, I located a nest with three eggs in a deserted garden at the base of Mount Royal. Since the latter date this species has gradually increased in numbers and to-day may be considered a fairly common summer resident.

PIRANGA ERYTHROMELAS, Scarlet Tanager.

"Transient visitant; common; I have not seen this bird in the autumn and like the Rose-breasted Grosbeak it probably returns south by another route."*

Likely breeding 100 miles to the north-west, in the Laurentians. From September 4th to 6th, 1909 and 1910, I saw numbers in partially cleared land near St. Faustin, Terrebonne County.

PROGNE SUBIS, Purple Martin.

"Summer resident; common."*

Our most numerous city birds, not considering the cosmopolitan "Sparrow," are those that feed on the wing. In order of abundance they might be listed as follows:—Chimney Swift, Nighthawk and Purple Martin. They are most commonly found along the Lachine Canal and river front, presumably as insects are there in greater abundance than elsewhere. This liking for the vicinity of water is evidenced in the autumn, when, sometime prior to their southern migration, they forsake the city and are to be seen in numbers over the river. Nighthawks and Swifts are apparently indifferent to the Sparrow and, in my estimation, the Martin is well able to hold its own. There are very few nesting boxes in the city but these few are well occupied by the Martins. Lack of these nesting sites along the canal and

river front—especially at Lachine—has caused the Martins to make extensive use of arc lamp reflectors. There are some Martin boxes on Guy Street near the Lachine Canal that I have passed almost daily during the last eight years. Early in the spring the Sparrows invariably occupy these boxes and as regularly, about the 6th of May, two or three pairs of Martins appear and immediately take possession. The Bank Swallow does not abhor the city when suitable nesting sites are attainable, and the Wood Pewee is a frequent summer resident. Both of these birds feed, to a great extent, on the wing. It would appear then, that birds pre-eminently of the air, can satisfactorily cope with existing conditions in the city; on the other hand, those of terrestrial habits, that feed largely amongst vegetation, are proportionately rare.

The average Upper Canadian town has a very fair population of birds. One finds the Yellow Warbler, Goldfinch, Red-eyed Vireo, Wood Pewee, Least Flycatcher, Oriole, Robin, Bronzed Grackle and others mingling with the English Sparrow. Here, almost every house, with the exception of those in the commercial district, has its garden. Several Quebec towns exhibit the other extreme in a marked degree. Even where land is not at a premium, one will often find whole rows of houses with no frontage and dusty back-yards for gardens. It is not surprising that the Sparrow should prevail here as there is little to attract other bird life. Travel into the country back of a certain one of these towns, on the north shore of the St. Lawrence and one will pass a succession of wooded ridges with a road in each valley. Glance along one of these valley roads, with its line of white-washed houses right in the dust of the highway and you can almost estimate the population. The forest forms an unbroken background on the distant ridge, while scarcely a tree obstructs the vision in the foreground. Here is the source of the conditions in the town and here again one finds the English Sparrow predominant.

DENDROICA MAGNOLIA, Magnolia Warbler.

"Transient visitant; common."*

Though not at all a common breeder in the vicinity of Montreal, I have thrice found its nest and have seen it on other occasions during the breeding seasons. It is common in the Laurentians to the north and one hundred miles to the east—in other words, it confines itself principally to the larger coniferous belts.

DENDROICA VIRENS, Black-throated Green Warbler.

"Summer resident; common spring migrant but scarce summer resident."*

This Warbler shows a decided preference for hemlock growths, and is locally common wherever this tree occurs in abundance.

SEIURUS NOVEBORACENSIS, Water-Thrush.

"Summer resident; scarce."*

I have found this species breeding fairly commonly in suitable localities, throughout the district. It prefers swamps of mixed ash and cedar where the rank growth of nettles half conceals stumps and upturned roots. This species frequently associates with the Canadian and Mourning Warblers.

OPORORNIS PHILADELPHIA, Mourning Warbler.

"Transient visitant; scarce."*

I have found this Warbler to be an almost equally common summer resident with the Water-Thrush. It does not always confine itself to swamps, however, as, on June 9th, 1905, I flushed a female from a typical nest and four fresh eggs, built in an isolated clump of goldenrod, sheltered by small sized hazel bushes, almost at the summit of the pine-fringed, rocky, western spur of Mount Royal.

WILSONIA CANADENSIS, Canadian Warbler.

"Summer resident; scarce."*

I should class this species as somewhat more numerous than the two last mentioned. Its bright song is to be heard in nearly all of our cedar swamps and occasionally I have found it domiciled in wet alder growths.

TOXOSTOMA RUFUM, Brown Thrasher.

"Summer resident; common."*

For some unaccountable reason this bird has apparently disappeared from the vicinity of Montreal. On 1st June, 1897, I flushed one from its nest and four eggs, in a hawthorn bush on the slope of Mount Royal. Previous to 1897, I had noticed a few pairs each season but have seen none since.

NANNUS HYEMALIS, Winter Wren.

"Transient visitant; common."*

I have only once examined a nest but have heard its song throughout the nesting season in various cedar swamps in the vicinity of Montreal.

SITTA CAROLINENSIS, White-breasted Nuthatch.

"Permanent resident; common spring and fall migrant, but scarce summer resident."*

The above coincides with the vocal activity of this species.

In the spring its nasal "yank" is most commonly heard, but when nesting it is extremely quiet, though, I believe, no less common. Often, during the month of May, while eating my lunch in the woods (by choice I should select rather open maple woods and sit by the sugar-shanty) I have been attracted by the faint lisping imitation of the male Nuthatch's spring-time call. After sighting the bird, busily searching for larvæ, it was usually not long before a sudden quick flight to feed its sitting mate, would disclose the nesting-site.

PENTHESTES ATRICAPILLUS, Chickadee.

"Winter visitant; common."*

The Chickadee should be described as a rather scarce summer resident, as I have found it breeding on several occasions, both on the Island and in the immediate vicinity.

HYLOCICHLA GUTTATA PALLASI, Hermit Thrush.

"Summer resident; common. Breeds in Mount Royal Park."*

Mount Royal has become too popular a resort for this species and it is a scarce bird on the Island in the nesting season. Fifteen miles to the north and thirty to the east it becomes the common Thrush of the respective localities. It is particularly fond of sandy ridges with a rather sparse growth of pine and white birch.

THE TEACHING OF INSECT LIFE AND ITS PRACTICAL IMPORTANCE.

BY C. GORDON HEWITT, D.Sc., F.E.S.,
Dominion Entomologist, Ottawa.

Each year sees the origin of new methods, new ideas, and new subjects calculated to produce a more prefectly educated child. There is no doubt a concomitant racking of brains on the part of teachers to adapt and correlate these new additions to their previous curricula. Not infrequently, owing to a somewhat overcrowded and hopeless conglomerated time-table, teachers, usually those whose minds are not sufficiently elastic to enable them to progress with the evolving systems, utter a sigh of despair when any new subject is suggested, and for the sake of these it is necessary to dispel their fears and soothe their troubled spirits with the assurance that this article does not suggest any addition to their systems of instruction: such a sin I would be unwilling to have laid to my account. The reasons

advanced in justification of these random remarks strung together to form an article, are: first, that it is hoped that it may assist those who wish to make the teaching of natural history, in reference to insect life more particularly, of practical value to the child in showing the relations which these animals bear to man; and secondly, to show that this can be accomplished without any addition to already existing curricula, and how it can be correlated with such, at first, seemingly unconnected subjects as geography, hygiene and history. Teachers are realizing that it is only by a correlation of subjects that a harmoniously balanced system of education, as opposed to the ancient, and in many quarters still extant watertight-compartment and cast iron systems, that an all-round developed mind and a mind capable of thinking and reasoning can be produced.

For many years it has been the custom of a number of teachers to give instruction, both in school and in the open field, in the natural history of certain of the commoner creatures. Every child knows the tadpole and is acquainted with the fact that the butterfly is not always the gaudy creature it would have us believe, but that it has passed through a far more lowly stage before its promotion to a winged condition. Such facts as these were commonly inculcated. Then, like a tidal wave, the cult of "Nature Study" swept over the country; a new gospel to many teachers, but an old one to those who were nature lovers themselves. The great benefit of this insurgence was that it assisted in establishing the importance, which all true educationalists have realized for many years, of teaching the child the nature, relations, and meaning of the things around it, its fellow inhabitants of the world. To teach the child to see, what to many people is a closed book, the "fullness of the earth and the riches thereof." To enjoy to the full the unsurpassed pleasures of a country ramble, and to become an intelligent member in the great fraternity of living creatures, instead of an ignorant dweller on isolated Olympian heights. That to my mind is the greatest value of a rational system of instruction and guidance in this inexhaustible lore.

But to-day, such instruction is even more important, for with the advance of scientific investigations we are discovering daily that these humble fellow creatures, especially insects, bear a far greater relationship to the welfare of man than was realized some years ago. What has prevented the penetration and colonization of immense areas of the continent of Africa? Not the hostility of native tribes, nor impenetrable forests, for man has overcome these obstacles in other countries; it was nothing more than the presence of two small insects, the malarial mosquito on the one hand and the tse-tse fly on the other. It wasnot solely the

exhaustion of financial means which prevented the cutting of the Panama Canal, so much as the impossibility of carrying on the work in that mosquito-infested territory, which obstacle has been overcome by the application by the United States officials of such anti-mosquito measures as the study of the mosquito problem has shown to be necessary. It is now realized that flies, such as our common domestic fly, were responsible, by the carriage of the germs of enteric fever, for far more deaths in the South African War than all the bullets and shells of our adversaries. The activities of insects not only increase the rates of mortality, especially of our young children, in large cities, but also deprive man of the results of his patient toil on the land. It is estimated that in the United States and Canada that the total annual loss due to the depredations of insects alone is from 10 to 25 per cent. of the total value of the crops produced, which loss annually amounts to millions of dollars.

As an example of the enormous depredations of injurious insects in Canada, a species of saw-fly is causing the destruction of all the larch or tamarack trees over a tract of 1,500 miles of forest. In the eastern United States, two insects, the gipsy moth and brown-tail moth, which have been accidently introduced from Europe, where they are kept in check by their natural parasites, are entailing an annual expenditure of over a million dollars in attempting to control them, and they are still spreading. These facts alone serve to indicate the practical importance, which is not usually realized, of the subject of insect life.

A few years ago an enthusiast suggested that the subject of economic entomology, as the science of entomology as applied to man's welfare is termed, should form a subject of the second curriculum. In reply to this it was pointed out by the writer that if insect life, or in fact animal life, were properly taught in schools, and no one will deny that such should be the case, this would necessarily include a consideration of the relation of animals to ourselves. It is not merely that the cow gives us milk, boots and knife handles; the sheep, clothing and food; the bee, besides being an example of industry, supplies honey and wax; and the silk worm, adornment; but what is equally if not more important (to quote a single example) the house fly is not only an annoying but a dangerous insect, and a menace to public health on account of its habits, which are now well known. These examples serve to show how insect life should be correlated with lessons on other subjects as hygiene, etc. Nor should teachers be unwilling to talk about the less attractive creatures such as the louse, in view of the reports of the Medical Inspectors of schools on the percentage of verminous children; this is not a pleasant subject for a teacher to deal with, but it is a very

necessary one, and one upon which there should be less ignorance than at present prevails. Instruction on insect life is incomplete and insufficient if these important aspects of the subject are not carefully interpreted to the child, and apart from the inherent utility, the increased interest aroused in the child's mind is such that the lesson will be remembered far better than if a mere "nature talk" of the usual type were given.

It is impossible in a short article of this nature, the object of which is one of suggestion rather than of formulation, to indicate the numerous subjects which insect and animal life treated in this manner supplies. There has been far too great a tendency in the past to treat animal life in a really lifeless fashion, and in a merely descriptive and "object lesson" manner. The interrelationship, the methods of living and the functions of animals have been insufficiently considered. To the child they existed, but existence is a small part of life. A living creature is not individualistic, it is a member of a vast kingdom of living beings, striving for existence, preying upon each other and in turn attacked insidiously by enemies greater or smaller than itself; seeking to secure the best means for the continuity of its kind, which is their chief end and paying dearly for mistakes in judgment or action. Individualism is impossible in the world of living things, every unit of life is dependent on and bears some relation to others, and, therefore, to treat them independently is not only impossible but wrong. A diatom is a microscopic unit of vegetable life and interesting in itself, but how much more interesting is it when we know it is not only one of the land-makers, by the accumulation of its microscopic skeletal structures, but also an important foundation of our food, for upon it numerous small crustacea feed, these in turn are consumed by larger crustacea of the crab family, and on these fishes subsist, and in this way contribute to the food of man himself. It is very rarely realized how dependent we are upon the constant warfare which is taking place in the realm of insect life for even our own existence. Were it not for the enemies of insects, to escape from which the latter are constantly striving, we should be deprived of every article of food, and vegetation would not exist, but the activity of certain insects, which are parasitic on the insects destroying our crops and vegetation, keeps them in check and thanks to the habits of those species of birds which feed upon insects, a balance is maintained. If a certain species of insects, owing to a plentiful supply of a suitable food, increases out of proportion, it is almost invariably checked by a concomitant increase in its enemies. The importance of parasitic enemies in controlling these insects destructive to vegetation and in maintaining this balance is well illustrated

in the case of the two moths to which reference has already been made, the gypsy moth and brown-tail moth, which have been introduced into America. They did not bring with them their parasites which keep them in check in European countries, and in the absence of these natural means of control they have increased enormously. For example, between the years 1896 and 1902, the brown-tail moth spread so rapidly that the infested area increased from about 26 square miles to 1,500 square miles. To-day, their parasites are being imported from Europe and Japan, and liberated in the United States in the hope that ultimately these natural means of control will render these insects no longer a conspicuous pest. This is a single instance out of many, showing the effects of this removal of the balance which Nature normally maintains, but with which man is constantly interfering. It can also be shown how insects affect commerce, prevent the colonization of countries, how they influence health, and how they may be responsible for the downfall of a people. No other group of animals bears so serious and important a relation to man himself, and any instruction, therefore, on insect life in which consideration is not given to these practical aspects of the question is as incomplete as a human being without hands.

In rural schools such knowledge is a *sine qua non*, and has been imparted in a number of such schools with which I am acquainted, but frequently owing to the want of the particular knowledge on the part of the teachers themselves such instruction is not given. The absence of instruction and suitable text books on the subject make this, to some extent, excusable, but if goods are demanded there is usually some attempt made to supply them, and if teachers will demand instruction of the nature I have endeavored to describe, efforts are sure to be made to provide the same. It is a question which rests with teachers, and to those these random remarks are made in the hope that a few may fall on good ground in addition to those which are destined to fall and be choked by the thorns of an over-crowded curriculum.

CONCHOLOGICAL NOTES.

Mr. Frank Collins Baker, of the Chicago Academy of Sciences, has issued his monograph on the Lymnæidæ of North and Middle America, recent and fossil. The volume is of 539 pages with 53 half-tone plates, and numerous illustrations in the text. The morphology of Lymnæa is fully dealt with, and a new and, I think, highly satisfactory classification arranged, based in the

main, as is proper, on anatomical characteristics. The meager descriptions of the earlier authors are amplified—in many cases—from a study of the types. In fact the type specimens were studied in all the cases in which they were accessible. Distinctions are clearly pointed out between forms which have hitherto been confounded; new species, as well as old, are accurately described and defined, and the exact geographic and geologic distribution of each carefully indicated. In the extended bibliographies which are given of every species and variety, mention is frequently made of the papers on conchology which appeared in the Transactions of the Club, THE OTTAWA NATURALIST, and the American Naturalist, from the pens of members of the Club, and the work of Heron, Taylor, Macoun, and others is often spoken of with appreciation. It may be said without exaggeration that Mr. Baker's volume is the most elaborate and satisfactory monograph on the Lymnæidæ ever published.

In Mr. Baker's monograph on Lymnæa, the *L. decollata* of our lists is classed under *Galba oronensis*, Baker. This determination is based, apparently, on shells collected by Heron. The shell found in the Little Chaudiere Rapids which also has been regarded as *decollata*, is considered by Mr. Baker to be a depauperate form of *Galba catascopium*, Say. This has long been my own conclusion, though Tryon thought otherwise. The Philadelphia conchologist was, however, not always accurate in his determination of Lymnæas. *L. lepida*, Gould, and *L. lanceata* Gould, placed in our list upon his authority should be dropped, at least until authentic specimens—if any exist here—are found.

Our *L. stagnalis* is not thought by Mr. Baker to be typical of the species, but as belonging properly to the variety *appressa*. This he divides into several sub-varieties. It would be of interest to represent on one plate the many varieties of *L. stagnalis appressa*, which occur near Ottawa, from the small form with a red lip band—found only in Portage Bay on the Hull side of the Ottawa below Tetreauville— to the monstrosities of the Rideau River, or the exquisite shells to be had on any day in late summer in the pond north of the Driveway where it diverges from Bank Street.

L.

The Editor would be grateful for short notes for publication from any member of the Club. Original observations are always of interest to our readers, whether they relate to plants or animals.

EXCURSIONS.

The excursion committee having decided to depart from the usual custom of holding excursions every Saturday afternoon during the spring and early summer, field meetings were arranged for every fortnight, each excursion to be devoted to the study of one particular subject. The first outing was held on Saturday, 29th April, at Mechanicsville, and was occupied with the study of the geology of the district along the bank of the Ottawa River. About a dozen enthusiastic workers attended under the leadership of Dr. P. E. Raymond, Mr. Jas. E. Narraway and Mr. W. A. Johnston. Dr. Raymond gave a general view of the structure of the rocks along the river bank by means of a diagram and pointed out where the most interesting geological features were to be found and the best places for collecting specimens. The party then spent two hours very profitably examining in detail the special features indicated by Dr. Raymond and in collecting specimens of fossils which were very abundant.

On the weathered surface of the Black River limestone many large cephalopods, mostly *Ormoceras tenuifilum* were seen, and Mr. W. A. Johnston was so fortunate as to find a specimen of a very rare cephalopod, *Nanno aulema*, a species previously unknown in the vicinity of Ottawa. One specimen of the coral, *Columnaria halli*, and very numerous brachipods, were also obtained from the Black River; while the lighter coloured and harder limestones of the Lowville yielded the characteristic coral, *Tetradium cellulosum*, the trilobites, *Badhyurus spiniger* and *extans*, and numerous little black ostracods, or water fleas.

W. J. W.

The second excursion was held on Saturday afternoon, May 13th, to Beaver Meadow, Hull. The party met at 3 o'clock, and two pleasant hours were spent in the woods bordering the meadow. The chief object of the excursion was to observe and study briefly some of the plants of the district. Unfortunately only a small number of members attended the excursion, but those who were present thoroughly enjoyed the outing. Some collections of plants were made for pressing, and many determined by Leaders as the party proceeded from place to place. While no plants of particularly rare occurrence were seen, still a number were found of considerable interest to those present.

The most conspicuous objects seen on the trees (wild cherry) were the webs of the American Tent caterpillar. These larvæ are exceedingly numerous this spring and are doing much

damage all through the district. In one small clump of cherry trees 26 of these webs were counted. A few of the early spring butterflies were seen and specimens of other insects and some myriapods were collected.

A. G.

BOOK NOTICES.

FORTY-FIRST ANNUAL REPORT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, 1910: 124 pp., 23 figs., 2 pls. Published by the Ontario Department of Agriculture, Toronto, 1911.

Founded as this Society was "for the investigation of the characters and habits of insects, the improvement of entomological science and more specially its practical bearing on the agricultural and horticultural interests of the Province" these annual reports have assumed since their genesis a double function, namely, the recording of entomological investigations complete or in progress and of scientific data, and also the discussion of the economic bearing of these investigations and their practical application. While it would appear to the outsider to be confined to "the interests of the Province," this is far from being the case. Not only does it include in its membership entomologists from all of the provinces of Canada, but the activity of its members displays its really national character. There is naturally a distinct overweight in favour of the older provinces which, it is hoped, time will correct.

The present report does not differ materially from former ones, containing as it does much of interest and value to the amateur entomologist, the scientific worker and to the practical farmer, fruit-grower and forester. In the first thirty pages the insects of economic importance which have been noticeable during the year (1910) are described by various members of the Society, the report of the insects of the Ottawa district, by Mr. Arthur Gibson, will be of interest to members of the Ottawa Field-Naturalists' Club; Mr. L. Cæsar refers to the insects of the year in Ontario. "Beetles found about Foliage" is a pleasing account of sylvan entomology, by Mr. F. J. A. Morris, and Dr. Fyles' account of "The Pool" reveals that veteran naturalist and observer at his best. The attraction which entomology has for the botanist is shown by Mr. J. E. Howitt's observations on the Bean Maggot. Mr. Norman Criddle's observations on the migration of locusts in Manitoba are a useful addition to a knowledge of our native species. Prof. T. D. Jarvis makes two contributions, the first being a most useful paper on the Coccidæ

or Scale Insects of Canada, and the second an account of the Aleyrodidæ ("White Fly") of Ontario. Prof. J. M. Swaine describes the life-histories and habits of several species of scolytids attacking the larch, his observations being a valuable addition to our all too meagre knowledge of the bionomics of the bark-beetles of Canada. He also describes the chief injurious insects of the year in eastern Quebec. Mr. Arthur Gibson makes some additional notes to his previous lists of insects attacking the basswood, or linden, and contributes "The Entomological Record for 1910," which is of no little value to entomologists in Canada. It is to be regretted that the report of Prof. James G. Needham's address on "The Role of Insects in Water Life" is in the form of a brief abstract. The subject is one not only of the greatest interest but of inestimable importance, especially in Canada where we have so much fresh-water life and where the conservation of our fresh-water fishes is in a large part dependent upon the amount of available food material which consists chiefly of fresh-water insects.

C. GORDON HEWITT.

THE HOME-LIFE OF A GOLDEN EAGLE, photographed and described by H. B. Macpherson, with thirty-two mounted plates. Second revised edition: London; Witherby & Co., 326 High Holborn, W.C. Published Price 5/- net.

The second edition of this delightful story of the home-life of a Golden Eagle, the King of Birds, has recently appeared. The spot chosen by the eagles was in a wild deer-forest situated in the heart of the Grampian range in Scotland. The nest was high up on a narrow ledge, and could only be reached with difficulty. A hiding place, close to the eyrie, was made and here the author was able to conceal himself and his cameras for hours at a time waiting for opportunities to photograph the birds and take notes of their habits. The 32 photographs secured are remarkably good and the running story told of the two parent birds and their young is most fascinating. The book should have a wide sale among nature lovers. It is beautifully printed, and the general "get up" excellent.

A. G.

The Committee on Public Health of the Commission of Conservation, have just issued a "Report on the Epidemic of Typhoid Fever occurring in the City of Ottawa, January 1st to March 19th, 1911." The report is an exhaustive one, covering 48 pp. It contains three maps and a number of full page photographic illustrations showing unsanitary conditions.

OBITUARY.

On May 23rd, 1911, Dr. Robert Wheelock Ells passed away at his home in this city, after a week's illness. In his death Canada loses one of her best known and ablest scientists, and the Ottawa Field-Naturalists' Club one of its most prominent members. Although failing health prevented his taking an active part in the Club's work for the past few years, he formerly gave it hearty support both in the lecture course and in the field excursions.

"The late Dr. Ells was descended from U.E.L. ancestors who came to Nova Scotia in 1761. He was born at Cornwallis, N.S., in 1845 and was educated at Horten Academy, at Acadia University and at McGill University from which he graduated in 1872 with first class honors and Logan gold medal in Geology and Natural History. He married in 1873, Miss Harriet N. Stevens, of Onslow, N.S. Joining the staff of the Canadian Geological Survey in 1872, he has since been constantly engaged in geological work in that branch of the service."

Dr. Ells was a fellow of the Royal Society of Canada, a fellow of the Geological Society of America, and a member of the Canadian Mining Institute. He was president of the Ottawa Field-Naturalists' Club for three successive years, beginning in 1898, and also president of the Literary and Scientific Society. Dr. Ells had also been president of the Ottawa Valley Graduates' Society of McGill University, and for a number of years past had held the position of representative fellow for the Province of Ontario on the corporation of McGill University. He has written many official reports on the geology and mineral resources of Canada, embracing almost every province from Nova Scotia to British Columbia. These reports were published by the Geological Survey of Canada, and were usually accompanied by illustrative maps, the surveys and data for their compilation being largely made and collected by himself.

In addition, he has written various papers on geology and kindred subjects which have appeared in THE OTTAWA NATURALIST, the Transactions of the Royal Society of Canada and other scientific publications. "He was perhaps best known in recent years for his work in connection with the problem of the utilization of the Oil Shales of Eastern Canada. It was indeed largely through his efforts that attention was first called to the great value of these deposits and his memoir published in 1910 is the standard work on this subject."

Personally, Dr. Ells was highly esteemed by all who had the pleasure of his acquaintance; he was a true friend and his kindly genial presence will be much missed by all his associates.

W. J. W.

THE OTTAWA NATURALIST

VOL. XXV. OTTAWA, AUGUST, 1911 No. 5

NATURAL HISTORY NOTES FROM CALGARY, ALTA.

By Norman Criddle, Treesbank, Man.

The following notes are from observations recorded at, and in the vicinity of, Calgary, during the months of January, February, March and April, 1911.

Calgary is chiefly situated in a valley caused by the shiftings of the Bow and Elbow Rivers; it is surrounded for the most part, by rolling prairie and as there are few trees of natural growth, the situation, though a picturesque one, is not of the best from a collector's point of view. The river banks, however, yield some interesting life, and a few miles to the west, all in the city limits, is a large bank well wooded with aspen poplar, spruce and various shrubs. Here, too, is situated a gray sandstone quarry showing numerous fossils, and no doubt systematic work would bring to light much of interest. There are, also, some balsam, poplar, and other trees along the river banks, and numerous fine young trees may be seen in the city itself. In fact, there are many interesting objects in nearly every branch of natural history, and the enthusiastic young society formed for just such a study will find lots to do for many years to come.

The winter climate is usually a mild one, but as I witnessed, can be extremely cold at times. The changes in temperature are, also, remarkably rapid, and it is these sudden changes coupled with the small snow fall that make successful treeplanting, especially deciduous trees, so difficult to accomplish.

For the first two months little wild life was observed. Redpolls were the only common birds that could be seen daily among the weeds on vacant lots, doing what others had neglected, namely, destroying weed seeds. On March 3rd, I made this note in my journal: "So far the following birds have been seen during the winter: Magpies, Northern Shrike, Snow Buntings, Redpolls, Pine Grosbeaks and House Sparrows." The first spring arrival was a Slate-coloured Junco, on March 21. Other birds were first observed on the following dates—it

must be remembered, however, that these are chiefly city records and that some of the birds doubtlessly arrived sooner in the country. April 3: five Horned Larks; variety not determined; one Tree Sparrow. April 9: One Flicker. April 11: Greater Yellowlegs. April 13: Sparrow Hawk and Rough-legged Hawk. April 14: Two Crows. April 15: Robins. April 19: Mallards. April 22: Western Meadowlark. April 23: One Phœbe, two Red-tailed Hawks. (The Phœbe was sitting upon a telegraph wire uttering a loud double note rather different from what I had been accustomed to; indeed it puzzled me at first and I was obliged to get quite close before I was satisfied as to its identity. Since then, I have seen two others which looker browner than the typical form seen in Eastern Canada. Mr. Wolly-Dod, of Millarville, tells me they breed at his place.) April 27: American Pipits quite common. May 1: A single Myrtle Warbler was seen—and that is all.

On April 25, I went to visit the well known Lepidopterist, Mr. Wolly-Dod, and there spent two delightful days looking over his fine collection, which is remarkably rich in long series of Noctuidae. It would, however, take too long to relate all the interesting things seen there; sufficient to say that I gained much useful information and that Mr. Dod showed that generous hospitality which is a trait of so many true naturalists. I came away laden with specimens which would have taken years of labour to have gathered together under ordinary circumstances.

Among the birds at Mr. Dod's place I was interested to find a pair of Chickadees building a nest in a fence post, and a Magpie's nest, observed from a distance. This was in a rather large willow bush in a very exposed position; it appeared to be a very bulky affair almost as large as a crow's. Magpies are fairly common in Western Alberta and are said to be injurious on account of their destroying the eggs of other birds. When one considers, however, how our crow is condemned, quite wrongfully, for the same offence we are apt to ask ourselves who the authorities are and what their evidence is worth. There is no question, however, that these birds are great thieves and are just as troublesome to the trappers as the well known Whisky Jack.

To the west of Calgary in the wooded bank before mentioned, several crows, a pair of Red-tailed Hawks and a couple of Bald Eagles were nesting, but not in peace. There are always some idlers, whose chief pleasure in life seems to be to kill, and such a band was noticed here, doing their best to exterminate the only birds of the kind found in the neighbourhood. Higher

up the river I saw a pair of Ospreys, and Miss Moodie, a well known and talented local botanist, informed me that those birds had nested for some years along the rivers.

I found mammals, with few exceptions, still rarer than birds. At Millarville, bush rabbits appeared to be fairly numerous and there were also some west of Calgary. I saw, also, the track of a coyote, and there are undoubtedly members of the deer tribe in places, though I did not come across any. Of all the mammals the common Grey Gopher, *Citellus richardsoni*, is by far the most abundant. These destructive rodents are everywhere and are so difficult to deal with, owing to their dislike for poison, that they are a continual source of injury to crops and require persistent attention to keep them within reasonable bounds. Here is an instance of the value of hawks, the absence of which is doubtless largely responsible for the hordes of gophers.

Owing to the earliness of the season few flowering plants were observed. The crocus anemone, *A. wolfgangania*, was in flower on April 10th, and a pretty little *Potentilla*, perhaps *pumila* or *concinna* was out on the 16th, while the Dwarf Phlox, *Phlox Hoodii*, first appeared on April 22, and a week later was out in profusion, some places being quite white with the flowers. *Juniperus horizontalis* and *Shepherdia Canadensis* were also in flower at this time. On the 24th, Wild Strawberry was observed and on the 29th *Lesquerella argentea*. On the 30th, a Dwarf Arabis was found along the river bank and also a single flower of *Viola conspersa*. The first of May was my last day in the field and but one additional flower was seen—*Thermopsis rhombifolia*. Several other plants were noted not yet in flower, many of them of much interest to me, but alas, I was obliged to leave them with their blossoms still unfolded.

For me, the greatest interest was centered in insects, particularly tiger beetles, and my first walk in the country was in quest of these creatures. I went out on April 16, in company with Mr. McDonald, with whom I was staying. We took the north bank of the Bow River, as being exposed to the sun and consequently giving more promise of success. We went westward and came upon the river some two miles out from the city. Here on the upper bank a *C. audubonii* was speedily secured, followed by a *graminea* and then other specimens of *audubonii*, while typical *obliquata* fairly swarmed on the sunny banks. The day was not particularly favourable, being both cool and windy, but in spite of that in approximately two hours' hunt we took 15 specimens of *obliquata*, 6 of *limbalis*, 9 of *audubonii* and 4 of *graminea*, as well as a *Calosoma zimmermanni* and several specimens of two *Eleodes* sp. All the Cicin-

delas were secured in much the same situation and in some instances all were taken together, but I observed that *limbalis* tended to inhabit damper soil, while *audubonii* and *graminea* preferred the drier land. The last two are remarkably alike in markings, in fact, are hardly distinguishable, apart from colour.

On the 22nd, I was out alone over the same ground and captured 19 *C. montana*; these were secured on the upper bank in dry situations where the vegetation was sparse. They had evidently but recently emerged from hibernating burrows, which accounted for their not having been seen previously. They are an interesting lot, being mostly immaculate and varying from black to bronze and occasionally greenish. A few more specimens of *audubonii*, *limbalis* and *obliquata* were secured and one *graminea*. On the 29th, I was along the Elbow in company with Mr. Eastham, of the Seed Branch, but we saw few insects, in fact did not look very hard for them, and only captured a single specimen each of *audubonii* and *montana*, both on the dry dark land which seems to be their natural habitat. On the 30th, I made my last excursion along the Bow with Mr. McDonald, who proved an enthusiastic collector and has a keen eye for natural objects. We found *obliquata* in vast numbers everywhere and secured several specimens of *montana*, *limbalis*, and *audubonii* and one of 12-*guttata*. Strange that here this species seems so rare, while at Aweme, Man., it is the commonest of all in just such localities as we passed over. Several of *obliquata* were noted at this time with their abdomen buried in the soil, evidently depositing eggs, but though we searched over the original ground and elsewhere we found no specimens of *graminea*, and I strongly suspect that these, in company with others, had congregated along the river banks to pass the winter, as is so often the habit of tiger beetles. When we first came upon them they had just appeared from their winter homes which later they left to return to their summer hunting grounds, but where those are situated is as yet unknown. That they do go elsewhere and do not associate with *audubonii* during the breeding season is to me a stronger reason for separating them than is the not very well marked difference in colour. It is interesting to find three varities so closely allied all in the same locality, yet even in so small an area each race finds conditions of soil and moisture that it prefers, and consequently separates it from its close allies.

Few other insects were observed and not more than a couple of dozen species were taken all told. These included a few specimens of *Calosoma zimmermanni* found burrowing in the earth, a few stoneflies, and the following Orthoptera: *Hippiscus*

maculatus or one of its forms, *Orphia frigida* and *Stiropleura decussata*, these being the only ones fully developed at this time.

I left for home on May 3rd, at the time when much life was only just awakening from its long winter sleep, so could only contemplate what I might have seen had I stayed.

SOME RAPTORIAL MIGRATIONS IN SOUTHERN ONTARIO.

By P. A. Taverner, Geological Survey, Ottawa.

In many ways, Point Pelee is one of the most interesting bird observatories in Ontario, if not in Canada. Stretching, as it does, from the lower extremity of Essex County south into Lake Erie, it forms the extreme southern point of the Canadian main-land and, reaching away out towards the outlying islands, helps to form a natural passage-way across the lake for the north and south migrations. That birds take advantage of these natural stepping stones on the way, is evident to any one who spends a migration season, especially a fall one, on the Point. The most marked demonstration of this migrational movement is shown by the great flocking of individuals that occur there annually. There are certain species that we expect to occur at times in great numbers and flocks of blackbirds that darken the sky or pass like shadows across the sun are regular and expected occurrences in the fall months; but at Point Pelee we find gatherings of other species whose non-gregarious habits are in striking variance with the phenomena we observe here. Species that seem usually to drift through singly or in small gatherings of unnoticeable size at times occur in numbers that are easily designated "flocks." Such occurrences have been observed in many species of raptores and unusual flights have been noted at the Point of Sharp-shin, Cooper, Red-tailed, Red-shouldered and Rough-legged Hawks and Acadian Owls.

That these aggregations of individuals during migrations are pure manifestations of gregariousness is an idea open to much doubt. In most cases indications point to the fact that they are but gatherings brought together by a community of interest and are the result of congestion of a wide migration front into the narrow bounds of the Point.

How much land of the summer ranges is drained by this Pelee migration route it is difficult at this writing to state, but from the few illuminating glimpses we have had on the subject it must be an extensive territory. Much more work, however, is necessary in the country to the north before anything definite

in this direction can be arrived at. Some of the notes on a few of these flights may be of interest to the readers of THE OTTAWA NATURALIST.

SHARP-SHINNED HAWK. (*Accipiter velox*).

Flights of hawks are not rare in literature, but the great majority of them are irregular in occurrence and rarely seem to occur twice in the same place or in successive years. At Point Pelee, however, a flight of this species can be looked for regularly, beginning about Sept. 10th and lasting irregularly for about a week. About the middle of October another flight usually occurs, lasting several days and then gradually diminishing until cold weather sets in. The writer first saw this flight on September 9th, 1905. Sharp-shins were but normally common and we saw but one or two each day. The next morning, however, we found them everywhere on the Point: beating about the edges of the shrubberies, darting through the coverts like shadows and winging their way up and down the Point just over the tree tops, while high in the air their forms could be seen at all altitudes until they looked like mere specks in the sky. Standing in a small opening in the woods and looking out over an open field we could count from twenty-five to thirty individuals at any time of the day. During the flight there is usually a steady stream of hawks crossing from the end of the Point out towards the Ohio shore opposite, and during the height of the migration a man can stand near the end of the Point and shoot Sharp-shins almost as fast as he can load and fire. On September 18, 1906, Mr. W. E. Saunders, in company with Mr. B. H. Swales and the writer, counted, between 11.24 and 11.54 a.m., 133 Sharp-shins that left the main land for across the lake. Besides these, 74 more went out to the end of the Point and returned again, without crossing. An interesting point to observe is that this early September flight is composed almost entirely of juvenile birds in the brown plumage and it was not until October 16, 1908, that we saw any adults at all. This flight was not quite as heavy as that of the early young birds but we noted over a hundred birds daily, nearly all being adult males. At our station at the end of the Point the birds pass so close that there is no difficulty in distinguishing either plumage or sex; many of them pass within almost arm's reach.

The effect of this great increase of raptorial life on the small birds is most interesting. Up to their advent the woods are usually swarming with the small species of warblers, flycatchers, etc., but as soon as the Sharp-shins put in an appearance these disappear to almost nothing and the woods are almost lifeless. Most of the small birds seem to leave immediately and what

remain keep so close to the dense underbrush as to be most difficult to find. In spite of all their care, however, great numbers fall victims to the hunting of the hawks, and little scattered piles of fresh feathers dot the ground under the shelter of the red cedars, from one end of the Point to the other. The Olive-backed and Grey-cheeked thrushes are the greatest sufferers, in fact it almost looks as if the hawks followed these species down from the north, but the warblers, flycatchers, vireos and sparrows also have much to endure. The Blue Jays seem much harrassed but are so well able to take care of themselves that but few are caught. They assume an air of watchful bravado and though they often frequent the most exposed positions and are loud in their discordant calling, they seldom venture far from the protecting grape-vines and at an instant's notice are ready to dive down into their protecting depths. Brown Thrashers keep close in the thickest juniper growths and slink across from cover to cover in the most inconspicuous manner possible. Flickers, though often attacked, seem always ready to dodge behind a branch when they see danger coming and we have seen little or no evidence of their suffering to any extent from the assaults of the little *accipiters*.

COOPER HAWK. (*Accipiter cooperi*).

Though the Cooper Hawk flight is nothing in extent like that of its smaller relative, it is still well worthy of mention. It comes later than the first flight of the latter and many of them remain with the Sharp-shins until well into the late fall and early winter. Our first experience with them was September 26, 1908, when 150 birds were observed a day. Since then we have almost always found them abundant any time about the latter part of September and early October. If the Sharp-shins are hard on small bird life the Cooper Hawks are much worse. The flickers and Blue Jays that escape practically scot free from the smaller hawks suffer extremely from these larger enemies, and among the feathery remains that we find scattered over the ground many are those of Meadow Larks that do not put in an appearance until well along in September. Neither of these two hawks seem to do much hunting or moving about in the early morning and are usually not in strong evidence until the sun is well up. As in the Sharp-shins, the first birds to arrive in the fall are the juveniles, while the later ones are nearly all adults.

RED-SHOULDERED HAWK. (*Buteo lineatus*).

This species that we listed in our "Birds of Point Pelee" (1907)* as, "the rarest *Buteo* on the Point," we have since

* Wilson Bulletin, 1907.

found to be also subject to periodic flights. We saw one such on October 30, 1908, when, during our three days' stay, we noted about fifty birds each day.

RED-TAILED HAWK. (*Buteo borealis*).

The only flight of this species noted at the Point was on October 30th—November 1st, 1908, when "numbers were in sight at any one time." Without doubt flights of both of these latter species occur with fair degree of regularity.

ROUGH-LEGGED HAWK. (*Archibuteo lagopus sancti-johannis*).

The Rough-leg is usually regarded as one of the rare hawks in Southern Ontario and the seeing of a couple of individuals a season is a matter of some congratulation. On November 2, 1908, Mr. W. E. Saunders described seeing what may well, in this species, be regarded as a flight. During the day he saw about thirty-four individuals, most of them in the evening, when twenty-six were in sight at one time. They were all high up and sailing in great lazy circles but gradually working to the south. Again, on October 16, 1910, we observed about a dozen under the same circumstances as the above, mingled with a lesser number of Red-tails and Red-shoulders. They remained very high up and at times they even vanished from sight in the field of our glasses.

ACADIAN OWL. (*Cryptoglaux acadica*).

The flight* of these diminutive little owls that we witnessed on October 15, 1910, was one of the most interesting occurrences of this kind that we have seen at the Point. In previous autumns we had found feathery remains of individuals that had been devoured by other larger birds of prey, but until this date we had never seen live individuals on the Point. This day, however, a few feathers scattered on the ground, caught our eyes and caused us to institute a careful search of the red cedar thickets; we were soon rewarded by the discovery of a bird sitting close up to a tree trunk and deep in the shadow of the concealing evergreen fronds. Shortly after, another was found and then more. In all, twelve birds were seen in time aggregating less than three hours. They were so inconspicuous and difficult to find that these could have made but a very small part of the birds that were present. We worked but a small part of the likely territory and without doubt the number of Acadian Owls present on the Point must have been very great. Most seen were within from six to ten feet of the ground and close up against the cedar trunks. They never flushed unless the branch they were on happened to be shaken, and sat so close and still that we were able to photograph one at

* See Auk, July, 1911, pp. 329-334.

close range and finally almost touched it with the hand without its flying. The following morning the owls were all gone. We worked the thickets well for them but without finding a single bird. With them disappeared a number of Long and Short-eared Owls that were haunting the same localities the day previous and which we strongly suspected were to blame for the death of the two or three little owls whose remains we ran across in the course of our rambles.

POPULAR ENTOMOLOGY.

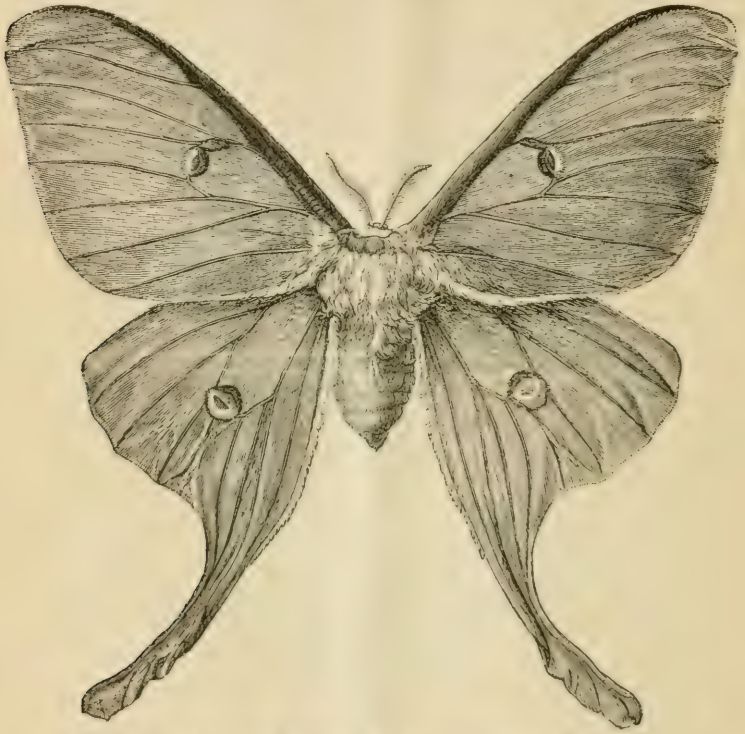
THE LUNA MOTH.

BY ARTHUR GIBSON.

Among the many kinds of beautiful insects which occur in North America, there are none which attract more general attention, when seen for the first time, than the large moths known popularly as Emperor Moths. Of these there are eight different species which occur in Canada: all belong to the family Saturniidæ. The caterpillars of these moths, known as the giant silkworms, are among the largest of the leaf-eating insects which we have. The larvæ are, of course, extremely voracious and, during this stage in the life of these insects, devour many times their actual weight of food. None, however, are of much economic importance, but where several occur on a small tree their work soon denotes their presence, and, if it is desirable to destroy them, hand-picking is the simplest remedy. Although the caterpillars of these Emperor Moths are so voracious, the moths themselves are unable to feed on account of their mouth parts being aborted.

The Luna Moth, *Tropæa luna*, which is figured on the next page, has most appropriately been styled "fair empress of the night" and "queen of the night." It was first described by Linnæus, in Systema Naturæ, in the year 1758, so has long been known to naturalists. It is indeed one of the most beautiful of all insects. The four wings are of a delicate green colour, the two front ones being bordered along the upper edge with purple, or purplish-brown, which colour also extends across the thorax near the head. The head, rest of the thorax, and abdomen is white, or pale greenish-white. The eye-like spot towards the middle of each wing is transparent in the centre and bordered with lines of white, pale purple, yellow and black on one side, and dark purple (or red), yellow, blue and black on the other side. The eye-like spot on each of the front wings is joined by a

band, which is mostly purplish, to the wide border, of the same colour, along the upper edge of the wings. The outer margins of the wings are also edged in the centre with purple, or purplish-brown. The legs are of the same purplish colour.



THE LUNA MOTH—SLIGHTLY REDUCED.

These moths may be found in Ontario and Quebec during the latter part of May and in early June. Specimens are often found in the day time, resting on the trunks of trees. They are active, however, only at night, when they are often attracted to the bright arc lights, especially those on the outskirts of towns and cities. Their flight is very graceful, and when seen flying around an electric light they are objects of much attraction, their long tails being very conspicuous in the bright light. Some seasons these moths are not uncommon. During the past few years many specimens have been sent to the Division of Entomology of the Dominion Experimental Farms, from widely separated localities. Almost all of the senders invariably make

the same remark, viz., that they had never before seen such a beautiful insect, and, of course, they all ask for its name and something of its life-history. Many of the boxes in which we have received these specimens contained, as well, pieces of sugar, etc. for the moths to feed on. Correspondents are surprised when told that they are unlike most other moths, in that they cannot feed.

Soon after the female moth emerges from the cocoon, she deposits whitish eggs, which turn dark before hatching. These are oval-cylindrical in shape and in size are about 2 mm. long by $1\frac{3}{4}$ mm. wide. They are attached to twigs or laid on the leaves upon which the caterpillars feed. In about from fifteen to twenty days, according to the season, the eggs hatch. The larvæ at first are pale green, about one-quarter of an inch in length, with brown markings on the head, and some have markings of the same colour along the side of the body. They cast their skins five times, and during the different stages noticeable changes take place. The tubercles on the body which at first are very small, become quite large in the later stages, and there is a conspicuous change in their colour. As the caterpillar becomes older yellowish lines appear on the body. The tubercles, when the larva is mature are, as a rule, pearl-colored tinged with purple; at the end of the body there are three brown spots edged with yellow. In some specimens the tubercles are of a much brighter colour; one writer described them as "blazing like a coronet of rubies." The larva is now about three inches long and of a beautiful pale bluish-green colour, the yellow band along each side of the body being conspicuous.

The caterpillar has been found feeding on walnut, hickory butternut, maple, birch, beech, oak, willow, plum and sweet gum. When mature, in late summer, it, as a rule, leaves the tree upon which it has been feeding and makes an irregular oval cocoon, generally among leaves on the ground. The cocoon is thin, not nearly as tough as that made by the American Silkworm, *Telea polyphemus*, which is a much more common insect in eastern Canada. The winter is passed as a pupa inside of the cocoon and the moths usually emerge in May.

THE PREPARATION OF A CATALOGUE OF THE INSECTS OF CANADA.

By C. GORDON HEWITT, D. Sc., *Dominion Entomologist*, Ottawa

At a meeting of the Executive Committee of the Entomological Society of Ontario, held at Guelph, Ont., on November

4th, 1910, it was unanimously agreed that the preparation of a catalogue of Canadian insects was desirable, and that such a list should be dedicated to Dr. C. J. S. Bethune, in recognition of his long and valuable services to Canadian entomology as Editor of THE CANADIAN ENTOMOLOGIST. A special committee of the society was appointed to arrange for and take charge of the work of preparing the proposed catalogue.

The following members constitute the committee:—Dr. E. M. Walker, (Pres.), Dr. C. Gordon Hewitt (Vice-Pres.), Messrs. G. Chagnon, N. Criddle, J. D. Evans, Arthur Gibson, W. H. Harrington, T. D. Jarvis, H. H. Lyman, G. A. Moore, G. E. Sanders, J. M. Swaine, A. F. Winn, F. H. Wolley-Dod and Prof. T. D. A. Cockerell.

Suggestions as to the form and scope of the catalogue, and the method of preparation, were drawn up and submitted to the members in a circular, issued on March 10th, 1911, with a request that it should be considered, and that further suggestions should be submitted.

Opinions which were submitted on the subject, and further suggestions on the part of members of the committee, have resulted in the formation of the following scheme, which will be adopted in the preparation of the catalogue, as they represent the views of the majority of the members.

1. The list will be entitled, "A Catalogue of the Insects of Canada and Newfoundland," and it will include all species known to occur in Canada, (including Labrador) and Newfoundland, whether previously recorded or not. Alaskan species will not be included, but may be published as an appendix.

2. The various species will be classified under the orders, sub-orders, families, sub-families, and genera, in ascending order wherever possible. The arrangement of the genera will be systematic and, so far as is possible, the species also.

3. The names will be given of the authors of all generic and specific names mentioned, with the date (year) in the case of each genus.

4. Under each species will be given:

(a). A reference to one or two good descriptions of the insect, not necessarily the original one; these will be descriptions which are as accessible as possible. If possible, reference will be given to a good published figure, and if such is contained in one of the references it will be indicated by the addition of (fig.) after the reference.

(b). The geographical distribution within Canada and Newfoundland; this will be indicated, as a rule, by

Provinces, in order from east to west, e.g., N.S., Ont., B.C., etc. The characteristic faunal zones inhabited by the species will be indicated, so far as it may be possible, by abbreviations; thus: Ar.-Arctic, H.-Hudsonian, C.-Canadian, T.-Transition, Au.-Austral. Where a species is known from a few localities only, the names of these will be given with the name of the captor in cases where the species recorded is of great rarity.

(c). If the type locality of a species is Canadian it will be given, and the places where type specimens of Canadian species are deposited will also be given when possible.

(d). The Latin name of the chief food plants will be given in the case of the Lepidoptera, Cecidomyiidæ, Aphidæ, Coccidæ, Phytophagous Hymenoptera and Coleoptera. (Gray's New Manual of Botany will be used throughout for the names of the food plants).

(e). In the case of parasitic species the name of the host or chief hosts will be given wherever known.

5. Recent important changes in synonymy will be noticed.

6. In the case of new and previously unpublished records the collector's name will be given in every case.

7. No species of which there is no trustworthy record or specimen available is to be included.

8. Fossil species will be included, and also introduced species, including greenhouse species, but the fact that they have been introduced will be indicated in those cases in which the fact is known.

The work of preparing the catalogue will be divided among the members, approximately, as follows:

Aptera, Orthoptera and Neuropteroid orders.—Dr. E. M. Walker.

Hymenoptera.—Messrs. W. H. Harrington, G. E. Sanders, and Prof. T. D. A. Cockerell.

Coleoptera.—Messrs. J. M. Swaine, G. Chagnon, N. Criddle, and J. D. Evans.

Lepidoptera.—Messrs. Arthur Gibson, H. H. Lyman, A. F. Winn, and F. H. Wolley-Dod.

Diptera and Siphonaptera.—Dr. C. Gordon Hewitt.

Hemiptera.—Prof. T. D. Jarvis, and Mr. G. A. Moore.

These members will be responsible for the lists prepared by them, and such lists will be published under their names. In the preparation of such lists it will be necessary to seek the co-operation and assistance of other specialists and all such assistance will be fully acknowledged.

The division of the work in the different orders will be

systematic rather than according to the geographical regions in which the members may be located; this will necessitate the co-operation of workers in different regions.

In the compilation of the catalogue it is intended to index the species on the regular card-catalogue cards 5 in. x 3 in., which will be supplied to the members. A single species will be listed on each card. The card will thus contain the information which it is intended to include in the catalogue. For example, the Spruce Budworm, *Tortrix fumiferana* Clemens, would be indexed and listed as follows:

T. fumiferana Clemens.
Proc. Ent. Soc., Phila., v. 139, 1865.
U.S. Ent. Comm., 5th Rep., pp. 830–838 (Packard), 1890.
Dist.: Eastern Can., Man., B.C.
Food Plants: Abies, Picea, Pseudotsuga.

The catalogue will be published, under the editorship of the writer, by the Geological Survey of Canada, by arrangement with and the consent of the Minister of Mines and the Director of the Survey. It will appear in parts as the different orders, or families, in the case of large families, are completed, and its publication will necessarily extend over a number of years.

GENERAL EXCURSION TO CHELSEA.

The general Excursion of the Club to Chelsea on May 27, was a most successful one. The attendance was fairly large and included many normal school students. The afternoon was spent chiefly in Gilmour's Grove and along the river bank. Most of those present were interested in botany, so under the leadership of Dr. Blackadar and Mr. J. W. Gibson, the party first visited the falls and then at once started to gather specimens. Only a few of the more interesting ones are here noted. Among trees the Striped Maple (*Acer pennsylvanicum*) and the Mountain Maple (*A. spicatum*) were in fruit. No doubt all the species of *Acer* could have been discovered, but the others were past the flowering stage. Among the herbs that have a more or less aromatic or edible root the following were noted:— Wild Sarsaparilla (*Aralia verdi-caulis*), the Dwarf Ginseng (*Panax trifolium*), the Toothworts (*Dentaria laciniata* and *D. diphylla*), the Wild Ginger (*Asarum canadense*) and the Indian Cucumber-root (*Medeola virginiana*).

The lily family is well represented at this time in the woods. Some well in fruit including the Bellwort (*Uvularia perfoliata*), the Dog's-tooth Violet (*Erythronium americanum*), the Purple Trillium and the large white one, (*Trillium erectum* and *T.*

grandiflorum). The following were in flower: the Clintonia (*C. borealis*), the False Spikenard (*Smilacina racemosa*), the "Wild lily of the Valley" (*Maianthemum canadense*), the Twisted-stalk (*Streptopus roseus*), the Solomon's Seal (*Polygonatum biflorum*) and the Painted Trillium (*T. undulatum*), formerly called (*T. erythrocarpum*).

There was only one specimen of the Orchis family brought in, the stemless Lady's Slipper (*Cypripedium acaule*), although a more careful search might have revealed several others which are known to grow in the neighborhood and to be in flower at this time, including the Showy Orchis (*A. spectabilis*), and two or more rein-orchis (*Habenaria orbiculata*, *A. bracteata*, etc.)

The buttercup family was represented by the small-flowered Crowfoot (*Ranunculus abortivus*) which grows in the woods, and very probably by the one that grows in the open fields, and named after one of our most enthusiastic leaders, (*R. Macounii*). The Columbine (*Aquilegia canadensis*) and the Baneberry (*Actaea rubra* and *A. alba*) were also in flower. Among the small herbs observed were the False Mitre-wort (*Tiarella cordifolia*), the Mitre-wort or Bishop's Cap (*Mitella diphylla*), the Dwarf Raspberry (*Rubus triflorus*), the Star Flower (*Trientalis americana*) and the Jack in the Pulpit, (*Arisaema triphyllum*). The tiny Twin-flower (*Linnaea borealis*) was just in bud, the Dwarf Cornel (*Cornus canadensis*) was just open, the Aromatic Wintergreen (*Gaultheria procumbens*) had lost most of their last season's delicious berries, as had also the Partridge-berry (*Mitchella repens*), to some hungry birds.

The ferns were well represented by the Polypody (*Polypodium vulgare*), the Beech Fern (*Phegopteris polypodioides*), the Oak Fern (*P. dryopteris*), the Lady Fern (*Asplenium felix-femina*), the Christmas Fern (*Polystichium acrostichoides*), the Marginal Fern (*Aspidium marginale*) and some others of this family; the Bladder Fern (*Cystopteris bulbifera*), the Sensitive Fern (*Onoclea sensibilis*), and the Ostrich Fern (*O. Struthiopteris*), the Common Moonwort (*Botrychium virginianum*) and probably several others of this family that were not recognized. The Maiden-hair (*Adiantum pedatum*) and the Interrupted Flowering Fern (*Osmunda Claytoniana*) were also seen.

One great advantage of these outings is the training of the eye, what to look for and where to look; to observe the many forms and outlines, the differing shades of green, and the character of the surface, whether it is smooth, or has a bloom, or is hairy or rough. When once a specimen has been determined and then carefully pressed, the plant is never forgotten, and whenever it is seen again it is recognized and many pleasant associations are recalled to memory. This profitableness and

pleasure of being able to recognize the trees and plants was referred to in his speech by one of the "Fathers" of the Club, and his apt quotation from Shakespeare was received with applause.

E. H. B.

BIRD NOTES.

TURKEY BUZZARD.—Mr. Andrew Hafflin shot one of these birds, near Lake de May, in January last. This is a new record for the Camrose district. The bird was reported to have spent several years around the lake, living on dead animals. Bird life was scarce in Northern Alberta last winter, there being no large migrations of such birds as the Great Gray Owl, Hawk Owl, or Snowy Owl. Some years in a day's drive a dozen of these birds can be seen. The reason they were so scarce last winter was, I think, owing to the extreme cold and much snow in the far north. I collected a beautiful male Evening Grosbeak in December and there were flocks of Pine Grosbeaks with us all winter.

F. L. FARLEY, CAMROSE, ALBERTA.

EVENING GROSBEAK.—The Rev. A. E. Richard reported that in February last, Evening Grosbeaks were present at Buckingham, Que., and attracted a good deal of attention. One flock of about thirty, which he had under observation was first seen in the latter part of December. The birds were seen later on Jan. 21st, Feb. 6th, Feb. 14th and Feb. 17.

NESTING OF BLACK DUCK.—On April 30th, while passing through some swampy ground at the edge of a large area of heavy timber at Rockfield, Que., we flushed a Black Duck off her nest of eleven fresh eggs. The nest, which was made of broken weed stalks and feathers plucked from the bird itself, was placed about 18 inches up on a mound and against the base of a large maple tree. Three hundred yards of the surrounding territory was under three inches of water.

W. J. BROWN, WESTMOUNT, QUE.

THE OTTAWA NATURALIST

VOL. XXV. OTTAWA, SEPTEMBER, 1911 No. 6

SOME NEWFOUNDLAND BIRD NOTES—MAY, JUNE, JULY, 1911.

By W. J. Brown, Westmount, Que.

The Newfoundland summer is very brief. By June 3rd, in the northern portions of the country, vegetation was not up, and the shrubs and bushes were just breaking into bud. In the spruce woods, snowbanks were repeatedly met with. Further south, however, the season was much more advanced. These conditions did not affect many of the birds, as nesting was going merrily on at this time. The warblers, as a whole, were perhaps a little late in arriving and did not start building until about the middle of the month.

It is regrettable that the Newfoundland Government officials do not take active measures in the direction of protecting the water-fowl. The fisherman not only take the eggs of the gulls throughout the breeding season, but shoot the young as soon as they are able to fly. Certain islands were visited on the western coast where the gulls had nested by the hundreds a few years back, and to-day the cliffs are occupied by a solitary pair of Northern Ravens.

The Reid-Newfoundland Railway, which is a narrow gauge one, probably runs through the most picturesque territory. Roughly speaking, the physical features of the island are apparently of a rocky and mountainous nature, punctuated with vast stretches of spruce woods and bogs, and well watered by streams, lakes, or "ponds."

The following list is the result of careful study and work at only six points contiguous to the line of the Reid-Newfoundland Railway, and is not, therefore, complete.

1. Loon. One pair seen on a small "pond" on June 6th. At this date they had not started to nest.

2. Black Guillemot. Fairly abundant. Breeding on the "Banks" on June 10th.

3. Glaucous Gull. Common. Several pairs had their

nests built out on large boulders in the centre of "ponds," but as the water was very cold and over our heads in depth, we could not examine them.

4. GREAT BLACK-BACKED GULL. Generally distributed along the western coast, and breeding. A few pairs were found nesting on small islands in "ponds" adjacent to the Bay of Islands, on June 10th.

5. HERRING GULL. Common resident. Observed everywhere off the Banks of Newfoundland, but their numbers are being rapidly decimated by the fishermen.

6. COMMON TERN. We saw a small colony at Bay of Islands on June 7th. At this date they had not started to build.

7. LEACH PETREL. Several burrows of this species located on an island, June 10th, but as the holes invariably ran under a large rock, a pick axe was necessary to examine the contents.

8. AMERICAN MERGANSER. Nest found, containing 9 fresh eggs, May 19th, on the Banks of the Humber River.

9. AMERICAN GOLDEN-EYE. Nest containing 8 fresh eggs found in a dead tree near the Humber River, May 21st.

10. AMERICAN EIDER. Saw two birds of this species at St. George's Bay, June 9th.

11. CANADA GOOSE. Common breeder. At the time of our visit the young were already hatched out and when they were approached the anxious parents were heard "honking" in the vicinity.

12. AMERICAN BITTERN. One individual heard "pumping" on June 1st; was undoubtedly breeding.

13. WILSON'S SNIPE. A very abundant species and noted wherever there was bog. One bird was heard overhead continuously from 9.30 p.m. to 4.30 a.m., June 9th. A nest containing 3 fresh eggs was found on a mound in a spruce bog, June 8th. On June 12th, another was located where the young had just left, as evidenced by the egg shells lying about.

14. LEAST SANDPIPER. Common. Several nests examined between June 3rd and 12th; one had three eggs and two others had four eggs, each in various stages of incubation. The sets were simply laid in depressions in moss off the margins of "ponds."

15. GREATER YELLOWLEGS. Saw a number up on the "plains" where the bird's harsh cries may be heard at any time. A nest of this species was found, June 3rd, with 4 badly incubated eggs, which were simply laid on a hill adjoining a large tract of spruce bog. On June 13th, two others were discovered in a similar location, four handsomely marked eggs being the complement in each case.

16. LESSER YELLOWLEGS. Saw two individuals on the barrens, but no nest was found.

17. SPOTTED SANDPIPER. Common along the shores of lakes and streams.

18. WELCH PTARMIGAN. In a dry place in a large area of spruce bog, and at one of the highest points reached by the Railway, we flushed a bird of this species off her nine fresh eggs, on June 6th. The nest was merely a depression in moss amongst spruce sprouts and thinly lined with feathers and grasses. Two other birds were seen out on the barrens in the same neighborhood, but investigation failed to reveal any more nests.

19. AMERICAN GOSHAWK. We saw a few specimens in the mountain regions, but they are not very common.

20. PIGEON HAWK. On June 6th a noisy pair were located in some heavy spruce timber at the base of a small precipice. After carefully looking for the nest in the trees, it was eventually found with four young, on a ledge of rock on the mountain side.

21. AMERICAN OSPREY. Not numerous. A few birds seen flying from the sea inland.

22. BELTED KINGFISHER. Fairly common along the Humber River, where a nest containing seven fresh eggs was taken on July 1st.

23. NEWFOUNDLAND WOODPECKER. Common in the mountainous country and breeding in large dead birch trees which had been charred by forest fires.

24. DOWNY WOODPECKER. Probably common, but we only saw half a dozen specimens.

25. ARCTIC THREE-TOED WOODPECKER. Saw three birds in the higher levels.

26. NORTHERN FLICKER. Common. Flushed one bird out of a hole in a dead birch, June 9th.

27. NIGHTHAWK. Saw a number flying over the cliffs at Bay of Islands.

28. KINGBIRD. A few specimens were seen along the shore of the Humber River.

29. ALDER FLYCATCHER. This species arrived about June 10th, at Bay of Islands; a few days later it was quite common.

30. LABRADOR JAY. A pair, or more, of these birds were observed at every point, and a few of them used to feed around our camp.

31. NORTHERN RAVEN. Fairly common, especially in and about the Bay of Islands. One pair had their nest of sticks on the cliffs of Gregory Island, but the young had already left.

32. CROW. Saw a few along the Railway line.

33. PINE GROSBEAK. Several old nests of this species were found and the birds observed to be fairly common.

34. AMERICAN CROSSBILL. Saw two individuals at Bay of Islands.

35. REDPOLL. Saw a flock of six or seven near the Humber River, June 7th.

36. SAVANNA SPARROW. Abundant and nesting everywhere in spruce bogs. Several nests were found during the last week in June, sunk in "caribou" moss and lined with grasses. We also noted this bird breeding on the graminaceous slopes of Gregory Island, which is nothing more or less than a perpendicular cliff rising out of the water and situated many miles out at sea.

37. WHITE-CROWNED SPARROW. Three birds only seen in stunted spruce woods.

38. WHITE-THROATED SPARROW. A common resident and abundant breeder. Many nests found on the ground in spruce woods during the first week in June, the sets ranging from two to four eggs.

39. CHIPPING SPARROW. Common, especially at Bay of Islands.

40. SLATE-COLOURED JUNCO. Not many birds seen. A nest with three incubated eggs was located on the ground in spruce woods, July 18th.

41. SWAMP SPARROW. Only two birds noted.

42. FOX SPARROW. A very interesting and abuundant species and a wonderful singer. This bird's flute-like notes were heard in the stunted spruce country at all times of the day. The following, by Mr. William Brewster, who visited Southern Labrador in 1881, well describes the song of the Fox Sparrow:—

"What the Mocking Bird is to the south, the Meadow Lark to the plains of the West, the Robin and Song Sparrow to Massachusetts, and the White-throated Sparrow to northern New England, the Fox Sparrow is to the bleak regions bordering the Gulf of St. Lawrence. At all hours of the day, in every kind of weather late into the brief summer, its voice rises among the evergreen woods filling the air with quivering, delicious melody, which at length dies softly, mingling with the soughing of the wind in the spruces or drowned by the muffled roar of the surf beating against the neighboring cliffs. To my ear the prominent characteristic of its voice is richness. It expresses careless joy and exultant masculine vigor, rather than delicate shades of sentiment, and on this account is perhaps of a lower order than the pure, passionless hymn of the Hermit Thrush; but it is such a fervent, sensuous and withal perfectly-rounded carol that it affects the ear much as sweet-meats do the palate, and for the moment renders all other bird music dull and uninteresting by comparison."

The Fox Sparrow is an early breeder. The birds arrived, we were told, about the last week in April and by the first of June many young were on the wing. From June 3rd to 5th about a dozen nests were found, with young in various stages of growth, and two others contained three fresh eggs each. The majority were placed two to five feet up in stunted spruce; two were located amongst the branches of fallen spruce, while a few were sunk in moss on the ground. At the end of the month several other nests were found containing three and four eggs. These, no doubt, were second sets. Most of the nests were composed of moss, rootlets, etc., with a lining of caribou hair, while those placed at an elevation were usually built externally with spruce twigs. The eggs are pale bluish-green, spotted and blotched with reddish-brown, or uniform chocolate brown.

43. TREE SWALLOW. Saw several specimens at St. George's Bay.

44. BANK SWALLOW. Several pairs starting to nest in some low-lying sand-pits at St. George's Bay, June 10th.

45. BLACK AND WHITE WARBLER. A fairly common breeder, nesting in spruce woods about June 15th.

46. YELLOW WARBLER. Several specimens noted, amongst the alders, June 7th, at Bay of Islands. A nest with four badly incubated eggs was found, June 27th, in a birch tree.

47. MYRTLE WARBLER. On June 8th we saw a bird of this species carrying nesting material. Not very common.

48. MAGNOLIA WARBLER. Six or seven birds seen in the stunted spruce along the Humber River, June 8th.

49. CHESNUT-SIDED WARBLER. Rare. Only two birds noted in some mixed woods, June 8th.

50. BAY-BREASTED WARBLER. Two individuals noted at Grand Lake, June 8th.

51. BLACK-POLL WARBLER. The most abundant warbler seen during our visit. They were seen everywhere in the spruce country. A nest with four fresh eggs was found, June 27th, in a small spruce tree.

52. BLACK-THROATED GREEN WARBLER. Heard many in the large hemlocks and pines at Bay of Islands, June 10th.

53. YELLOW PALM WARBLER. We heard this species singing every morning early around our camp at Grand Lake.

54. WATER THRUSH. Fairly abundant. A nest found, June 4th, in the upturned roots of a tree. The bird had not started to lay.

55. NORTHERN YELLOWTHROAT. Common amongst the alders and willows along the Humber River.

56. WILSON'S WARBLER. Common and observed wherever we pitched our camp.

57. CANADIAN WARBLER. Fairly common in the spruce woods.

58. WINTER WREN. Heard this species singing all day long in damp evergreen woods.

59. RED-BREASTED NUTHATCH. Saw several in the mountainous country, where they were breeding.

60. CHICKADEE. Common all over the country.

61. RUBY-CROWNED KINGLET. Very abundant. This species, like *Passerella iliaca*, is a very interesting one and a delightful singer. For such a small frame the bird has extraordinary powers of song, and from the tops of stunted spruce he can be heard at all hours of the day. On June 4th a nest with four fresh eggs was found. On June 9th, 15th and 28th, three others of nine eggs each, respectively, were discovered, all the nests being suspended from the branches of stunted spruce trees. They were built of moss, fine strips of bark and heavily lined with feathers of various birds.

62. WILSON'S THRUSH. Not as common as the following species, but a few specimens were seen at different points.

63. HERMIT THRUSH. Abundant. A nest found on June 4th, contained three fresh eggs. Several other nests were located later in the month. Another wonderful singer. It was worth while making the trip just to hear the present species, the White-throated Sparrow, the Fox Sparrow and Ruby-crowned Kinglet in their favorite songs.

64. ROBIN. Abundant everywhere, nesting commonly the first week in June.

Our party consisted of Mr. E. Arnold, Montreal; H. W. Beers, Bridgeport, Conn. and the writer. We are all looking forward to a return visit next year.

THE ALGAE OF THE BRUCE PENINSULA.

BY A. B. KLUGH, M.A.,
(Botanical Department, Queen's University, Kingston, Ont.)

The Bruce Peninsula lies between Lake Huron and Georgian Bay in Ontario. The Peninsula consists of limestone which forms high cliffs on the Georgian Bay shore, while the Lake Huron shore of the lower part of the Peninsula is low and sandy with some limestone points.

Algal habitats are abundant on the Peninsula. In addition to the shores of Georgian Bay and Lake Huron there are several

lakes near the base of the Peninsula, three of which are joined into a chain by rivers. Springs and small streams abound, and swales and swamps are common. Near the Lake Huron shore are extensive bogs and at Mud Lake is a large bog.

The places mentioned in these notes are located as follows: Wiarton, Colpoy's Bay, Cape Croker, Hope Bay, Barrow Bay, and Lion's Head on the shore of Georgian Bay; Oliphant and Golden Valley on the shore of Lake Huron; Adamsville, Purple Valley and Mar in the interior.

These notes are not presented in the belief that they constitute a complete list of the algae of the region, since they are the result of but two months' work—May and June, 1911—and no forms are included which were not in perfect shape for identification. In the case of *Anabaena*, *Spirogyra*, *Vaucheria*, *Zygnema*, and *Oedogonium*, this limits the list very considerably since fruiting material is always rare compared with that in a vegetative condition. The majority of the species recorded constitute first records for Canada.

CYANOPHYCEAE.

Chroococcus turgidus, Naegeli. Bog, Mud Lake, near Colpoy's Bay June 7; Marsh, Oliphant, June 14.

Gloeocapsa rupestris, Kuetzing. Common on stones in pools in rock of limestone point on shore of Lake Huron at Oliphant, June 14.

Microcystis marginata, Kuetzing. Floating among other algae at windward shore of Sky Lake, near Oliphant, May 28; Bog, Mud Lake, near Colpoy's Bay, June 26.

Coelosphaerium kuetzingianum, Naegeli. Floating among other algae at windward shore of Sky Lake, May 28.

Merismopedium glaucum, Naegeli. Plankton. Pool on the Commons, Colpoy's Bay, May 8, 1911; Swale, Colpoy's Bay, May 20; Pool, McGregor's Harbour, Cape Croker, May 30; Shore of Lake Huron at Oliphant, June 14; Sky Lake, May 28.

Oscillatoria tenuis, Agardh. Damp place on rock, Colpoy's Bay, May 11.

Oscillatoria subtilissima, Kuetzing. Damp place on rock, Colpoy's Bay, May 11.

Oscillatoria formosa, Bory. On timber in a small stream near Colpoy's Bay, May 27.

Nodularia paludosa, Wolle. Swale near Colpoy's Bay, May 20; Swamp, Golden Valley, June 1.

Anabaena torulosa, Lagerheim. Swale, Colpoy's Bay, May 20; Swamp, Golden Valley, June 1.

Scytonema crispum, Bornet. Rock pool, rocky point, shore of Lake Huron at Oliphant, June 14.

Scytonema mirabile, Bornet. Sky Lake, near Oliphant, May 28.

Scytonema myochrous, Agardh. Bog, Oliphant, May 28.

Tolypothrix lanata, Wartmann. Sky Lake, near Oliphant, May 28.

Stigonema mamillosum, Agardh. Bog, Mud Lake, near Colpoy's Bay, June 7.

Calothrix parietina, Thuret. Damp place on limestone rock, Colpoy's Bay, May 11.

CHLOROPHYCEAE.

Ophiocytium cochleare, A. Braun. Swale, Colpoy's Bay, May 20; Swamp, Golden Valley, June 1; Swamp near Boat Lake, June 16; Ditch, Oliphant, June 14.

Ophiocytium parvulum, A. Braun. Swale, Colpoy's Bay, May 20; Swamp, Golden Valley, June 1; Bog, Mud Lake, June 7; Swamp, near Boat Lake, June 16; Ditch, Oliphant, June 14; Pool, Hope Bay, June 8.

Ophiocytium gracilipes, Rab. Scarce, in a collection from a marsh on the Cape Croker road, May. 30.

Conferva bombycina, Agardh. Swamp, Golden Valley, June 1; Swamp, Mar road, June 5. Ditch, near Boat Lake, June 16; Stream in sandy shore, Oliphant, June 14.

Zygnema leiospermum, De Bary. Common near mill at Lake Isaac, June 5.

Spirogyra catenaeformis, Kuetzing. Bog, Mud Lake, June 26.

Spirogyra varians, Kuetzing. Common, with abundant zygospores, in ditch near Wiarton, May 5. By May 26 it had completely disappeared though the ditch still contained plenty of water. Scarce in a swamp near Boat Lake, June 16, zygospores present.

Spirogyra orthospira, Naegeli. Small stream from spring, Oliphant, June 14, in all stages of conjugation; Ditch, Colpoy's Bay, June 23.

Spirogyra weberi, Kuetzing. Common in pools in sand of shore of Lake Huron at Golden Valley, in all stages of conjugation, June 1; Ditch, Lion's Head, June 8, just beginning conjugation; in small stream in sandy shore at Oliphant, June 14, spores mature; Swamp, Adamsville, June 8.

Spirogyra insignis, Kuetzing. Ditch, near Wiarton, June 4, spores nearly mature.

Mougeotia genuflexa, Agardh. Common in a small marsh near Purple Valley, May 30, very sparingly fruited; Swamp, Golden Valley, June 1.

Mougeotia scalaris, Hassall. Near mill, Lake Isaac, June 5; Pool in swamp at Mud Lake, June 6.

Mougeotia viridis, Wittrock. Common in swale, Colpoy's Bay, May 20.

Chlamydomonas communis, Snow. Abundant in a collection from a swamp on Mar road, June 5.

Chlamydomonas globosa, Snow. Common in pools and swamps throughout the Peninsula.

Haematococcus pluvialis, Flotow. Common in pools in holes in limestone point on Sky Lake, near Oliphant, May 23.

Pandorina morum, Bory. In small marsh at Sky Lake, May 28; in marsh on Cape Croker road, May 30; Swamp, Golden Valley, June 1; Abundant in a collection from a swamp on Mar road, June 5.

Volvox aureus, Ehrenberg. Scarce in a collection from a swamp on Mar road, June 5.

Tetraspora lubrica, Agardh. Common in a stream in a pasture, Colpoy's Bay, April 30; in pools along a bush road, near Mar, May 10. In a stream between Colpoy's Bay and Purple Valley, May 27.

Chlorococcum humicola, Rabenhorst. Common under dripping water.

Characium naegelii, A. Braun. Common on other algae, particularly on *Conferva bombycina* throughout the peninsula.

Characium ambiguum, Hermann. On *Conferva bombycina* in swale near Colpoy's Bay, June 20.

Rhaphidium falcatum, Cooke. Swamp, Mar road, June 5; Ditch, near Boat Lake, June 16; Pool, Hope Bay, June 8; Shore of Lake Huron at Oliphant, June 14.

Rhaphidium falcatum aciculare, Hansgirg. Swale, Colpoy's Bay, May 20; Pool near Colpoy's Bay, May 30; Common in swamp near Golden Valley, June 1.

Nephrocytium agardhianum, Naegeli. Swamp on Mar road, June 5.

Tetraedron minimum, Hansgirg. Pool, Hope Bay, June 8; Small stream, Oliphant, June 14.

Scenedesmus bijuga, Wittrock. Pool, Hope Bay, June 8; Pond or Commons, Colpoy's Bay, May 11.

Scenedesmus obliquus, Kuetzing. A common plankton form throughout the Peninsula.

Scenedesmus quadricauda, Brébisson. A common plankton form throughout the region.

Scenedesmus quadricauda abundans, Kirchner. Pool, McGregor's Harbour, Cape Croker, May 30; Ditch, near Boat Lake, June 16.

Coelastrum proboscideum, Bohlin. Swale, near Colpoy's Bay, June 5; Marsh, Oliphant, June 14.

Scenedesmus spinulosum, Naegeli. Scarce, in collection from a pool at Hope Bay, June 8.

Hydrodictyon reticulatum, Lagerheim. Forming a sheet over the surface of a large pool at edge of swale near Colpoy's Bay, June 5.

Pediastrum boryanum, Meneghini. A very common plankton form throughout the Peninsula.

Pediastrum tetras, Ralfs. Scarce, in collection from a marsh at Oliphant, June 14; Pool, Hope Bay, June 8.

Ulothrix aequalis, Kuetzing. This species and *Ulothrix zonata* are the commonest filamentous forms on the rocks of the shores of Georgian Bay. They occur in patches consisting of one species only. Gametes were mature on April 30.

Ulothrix zonata, Kuetzing. Common on rocks along shores of Georgian Bay; fruiting on May 7.

Oedogonium capillifarme, Kuetzing. Swale, Colpoy's Bay, June 5.

Chaetosphaeridium globosum, Klebahn. On *Oedogonium capillifarme* in swale, Colpoy's Bay, June 5.

Chaetophora elegans, Agardh. Forming globular gelatinous masses about 5mm. daimeter on stones in a pool on the Cape Croker road, May 30; forming light green spheres from extremely minute size up to 1 mm. diameter on sticks at edge of a willow swale near Colpoy's Bay, June 5.

Chaetophora incrassata, Hazen. Attached to log in a ditch, near Wiarton, May 12; common on stones at bridge over Patanelly River, near Mar, June 1.

Stigeoclonium lubricum, Kuetzing. Common in a little stream from a spring near Wiarton, May 5.

Draparnaldia acuta, Kuetzing. In pools with *Tetraspora lubrica* on a bush road near Mar, May 10, Stream near Wiarton, May 19; Stream near Golden Valley, June 1.

Draparnaldia glomerata, Agardh. Swale, Colpoy's Bay, May 20; Swamp, Golden Valley, June 1.

Pleurococcus vularis, Meneghini. Common on trees, walls, etc.

Tretepohlia aurea, Martius. Scarce on limestone rocks in *Populus-Thuia* scrub along Mar road, June 20; forming bright orange velvety cushions from 1 to 2 dm. in extent; Forming light orange-colored patches on rocks along the shore road at Colpoy's Bay, June 25.

Cladophora callicoma, Kuetzing. Scarce in stream at Colpoy's Bay.

Vaucheria sessilis, D.C. Common in swale along Wiarton road, oöspores not yet mature, June 23.

Vaucheria geminata racemosa, Walz. Swamp near Boat Lake, June 15.

THE FERTILIZING VALUE OF RAIN AND SNOW.

By FRANK T. SHUTT, M.A.

In the ascension and descension of water—the continuous rise of aqueous vapour from land and water surfaces, and its interrupted fall as rain and snow—we have natural phenomena of the greatest importance to the maintenance of vegetable and animal life on the earth. Some few years ago the writer traced in a lecture before the Ottawa Field-Naturalists' Club, the various ways in which this constant circulation of the world's water supply affected our health and commerce, and how above all it was necessary for the growth of our crops. As one of the minor ways in which rain and snow contributed towards the maintenance of plant life, it was pointed out that in their fall through the atmosphere they cleansed it of certain nitrogen compounds—ammonia and nitrates—gaseous compounds arising from the combustion of fuel, from the oxidation of food in animals, from the decomposition of nitrogenous organic matter in the soil and from electric discharges in the atmosphere, and it was further shown that these compounds brought down by the rain and snow furnished to our crops a notable amount of most valuable food. It was with the object of determining, as closely as might be possible, the average annual amount of available nitrogen so furnished per acre, that some years ago the analysis of each fall of rain and snow was undertaken in the chemical laboratories of the Experimental Farm, Ottawa. This work has afforded interesting data, some of which may now be presented.

During the year ending February 28, 1911, the rainfall was 19.67 inches and the snowfall 73.0 inches, a total precipitation of 26.97 inches—practically 10 inches below the average for this locality. Omitting many of the details we may state that this precipitation furnished 5.271 lbs. of nitrogen per acre. This is about 1 lb. more than we obtained for the first year of observation (ending Feb. 29, 1908), but markedly less than that for the following year (ending Feb., 1909), viz. 8.364 lbs. per acre. This latter we concluded was abnormally high and was to be accounted for by the extensive bush fires which heavily charged the atmosphere with smoke for at least two of the summer months in 1908. A summary of the four years' investigation may be given in tabular form.

PRECIPITATION AND AMOUNT OF NITROGEN PER ACRE, OTTAWA, 1908–1911.

	Rain in Inches	Snow in Inches	Total Precipitation in Inches	Pounds of Nitrogen per Acre
Year ending—				
February 29, 1908....	24.05	133.0	37.35	4.322
" 28, 1909....	22.99	96.25	32.63	8.364
" 28, 1910....	28.79	80.75	36.87	6.869
" 28, 1911....	19.67	73.00	26.97	5.271

It will be observed that the present figure (5.271 lbs.) is practically the mean of the amounts recorded for the two years 1908 and 1910. It probably represents therefore, approximately, the amount of the nitrogen furnished per acre annually by the rain and snow in the neighborhood of Ottawa.

The analytical data show that of this amount, 4.424 lbs. (approximately 84 per cent.), was contained in the rain, and .847 lbs. in the snow. These proportions (though not the amounts) are those of the previous year—an interesting fact. The data further indicate that of this total amount of nitrogen, 3.733 lbs. were present as ammonia compounds and 1.538 lbs. as nitrates and nitrites, all of which from the agricultural point of view may be considered of equal value, the ammonia compounds readily undergoing conversion into nitrates (the form in which plants absorb their nitrogen), in the soil.

THE OCCURRENCE OF THE LARVA OF THE WANDERER, FENISECA TARQUINIUS, IN NOVEMBER.

BY ALBERT F. WINN, MONTREAL.

This butterfly, whose habits are wholly unlike those of any other species in North America, has never been taken in any numbers on the Island of Montreal, though it fairly abounds all through the Laurentian hills within forty miles to our north, wherever the alder and its clusters of woolly lice are found. Students of insects are familiar with its curious life-history, and extraordinary chrysalis, but the finding of the larvæ feeding upon the lice on the first of November, after we had had about two inches of snow, was to me, at all events, rather unexpected and

must indicate that the butterflies fly as late as October. In 1902, at Lake Lachigan, the butterflies were common on September 1st in all conditions, from freshly emerged specimens to those which had scarcely sufficient fragments of wings left to enable them to fly, but from the larvæ which I brought home, although some turned to pupæ early in September, the butterflies did not appear till the end of November and through December and January. They were, of course, kept indoors in a warm room.

In species which have more than one annual brood it is difficult to define the dates of appearance and disappearance of all but the first, but judging by my experience it would be absolutely impossible to state how many broods there were annually of *F. tarquinius*. Like several others among our butterflies, *Colias philodice* for example, it appears to keep on laying eggs, which continue to hatch into larvæ, which continue to eat until one day becomes too cold for their existence or that of their food supply, and every stage is wiped out except the one which Nature ordained should pass the winter. In *F. tarquinius* the chrysalis hibernates, and again Nature has in some way arranged that the butterflies do not all appear at once, a most necessary provision, as the supply of food for the young larvæ would soon be exhausted if the eggs were laid and hatched about the same time. Not only do the butterflies appear extended over a considerable period of time, but the egg-laying period is a long one, how long I do not know. Any one who has watched one of the females flying about the alders picking out a cluster of lice in the midst of which to deposit an egg or possibly two, will realize what a slow process it is. The butterflies seem to understand perfectly when there are enough of their larvæ to each cluster of lice and do not lay eggs in clusters already tenanted, until such time as there is a certainty that the big larvæ will be out of the way by the time the little ones hatch.

I have never seen *F. tarquinius* larva leave one cluster and journey along a stem to another, and think they seldom leave the spot where they first hatch. If they did this I fear there would be little chance of their escaping the attack of parasitic hymenoptera, which are always to be seen around the snowy clusters of lice.

The relation of insects to their food is one of the most important matters for an entomologist to consider, in fact everything, both from an economic and scientific standpoint depends on a thorough understanding of these. To anyone fond of nature who wishes to have a great deal of pleasure without a knowledge of ten thousand ever changing Latin (or Greek) names, we should recommend studying the life of some one common insect in its entire annual life-history, its relation to the plants on which it feeds and the parasites or other enemies that feed upon it.

BOOK NOTICE.

LANDS, FISHERIES, GAME AND MINERALS: Commission of Conservation, Canada.

This most valuable publication has recently been issued by the Dominion Commission of Conservation. It is a book representing a great deal of exacting research work, and will be found exceedingly instructive and entertaining to everyone interested in this great country of ours. The volume is a large one of some 525 pages, substantially bound in cloth and fully illustrated throughout with maps, diagrams and two-colour photo engravings.

The section devoted to Lands describes the agricultural survey of one hundred representative farms in each province, made by the Commission of Conservation in order to ascertain just what the condition of agriculture is in Canada. Some of the subjects on which information was obtained are: rotation of crops, use of manures, prevalence of weeds and insect pests, water and fuel supply and the use of selected seed. One of the striking facts revealed is that not more than nine per cent. of the farmers of Canada follow any intelligent and effective rotation of crops. By the adoption of more scientific methods which could readily be put into effect, it is estimated that the field crops of the country could be doubled in twenty years. The report is replete with agricultural information, valuable because it is not hearsay, but a statement of actual facts scientifically obtained by men in the field. An article on Agricultural Production in Canada indicates just what each province has produced of field crops, fruit and live stock since 1891, and also gives crop areas and comparative crop yields.

The part on Fisheries and Game is a valuable compendium of facts and conclusions by various experts. On account of the frequent disputes over jurisdiction in the case of fisheries between the Provinces and the Dominion, an analysis is given of the clauses of the British North America Act referring to fisheries, showing what powers each authority has. Following this is a digest of the Federal and Provincial fisheries laws and regulations.

Mr. James White, Secretary of the Commission, has an important article on the North Atlantic Fisheries Dispute in which he traces the historical development of the case leading up to the late Hague arbitration, gives the terms of settlement and recounts the advantages accruing therefrom to Canadian fishing interests.

The Canadian Oyster Industry is dealt with by Mr. J. Patton, Assistant Secretary of the Commission. The statement is made that Canada pays out annually over $350,000 for oysters

imported from the United States, when the natural conditions in this country are excellent for producing all that is required for home consumption. The Canadian output has decreased from 64,646 bbls. in 1882 to 38,535 bbls. in 1909, in spite of the fact that prices have risen 240 per cent. in the past 20 years. This degeneration of the industry is due very largely to the long-standing dispute over jurisdiction between the Provincial and Dominion authorities, which has left the oyster fisherman in such a state of uncertainty as to his holdings that he will not undertake the artificial cultivation of oysters. The article relates the experiments of other oyster-producing countries and shows that the only means of rehabilitating the industry is by definitely settling the jurisdictional dispute so that oyster culture may be confidently engaged in by private individuals.

Mr. C. W. Gauthier, a practical fisherman, in an article on "Whitefish in the Great Lakes," strongly advocates the establishment of more hatcheries for the artificial propagation of that species of fish. Maps are reproduced showing the area frequented by whitefish in each of the Great Lakes. Following these, is a statistical article on Fish Culture in Canada, which points out that last year only fifty-six per cent. of the appropriation voted for this purpose by the Dominion Parliament was expended. In other articles the fisheries of Manitoba, Prince Edward Island and British Columbia are described and measures necessary for their conservation suggested.

In the section on Game there is a full description of the game and game fisheries in Nova Scotia, Prince Edward Island, Quebec, Saskatchewan and British Columbia. This portion of the report will be found of especial value to the sportsman in search of good hunting and fishing territory. At the end of the section a statistical article gives the amount of revenue derived from the fishery and game resources of each province.

The Minerals section of the report opens with a summary of the Provincial and Dominion laws and regulations respecting mining. An exhaustive article on the conservation of mineral resources, by Mr. W. J. Dick, Mining Engineer for the Commission, takes up each mineral of economic importance in Canada, showing the extent of the deposits, the consumption, and the methods of mining; and recommends measures for conservation. Mining accidents in Canada and in foreign countries are fully dealt with in another article and suggestions are advanced pointing out how the heavy death rate in Canada from this cause may be reduced.

The volume is perhaps the most thorough and complete record of investigation and research that has ever been issued by any government in Canada.

NOTES.

AN UNUSUALLY EARLY RECORD OF THE ARRIVAL OF THE BLACK-THROATED GREEN WARBLER (*Dendroica virens*) AT OTTAWA.—The arrival of this species of wood warbler was noted last spring by Miss V. Lees and Mrs. Brown, of Ottawa East, when they saw and heard one of these birds on the canal bank near Bank Street on the 15th April. Miss Lees saw it first and an hour or two later Mrs. Brown, passing the same way, also saw and heard it near the same spot.

BLUE JAY IMITATING RED-SHOULDERED HAWK.—In the April number of the NATURALIST, Mr. L. M. Terrill, of Westmount Que., correctly ascribed the authorship of some Red-shouldered Hawks' notes, which he heard when none of those birds were in evidence, to the Blue Jay. It may be added that this is a very common performance on the part of the Blue Jay. Its very exact imitation of the Red-shoulder's notes may frequently be heard, e.g., at Beechwood, Ottawa, where both birds are found. It is proficient in the imitation of the notes of other birds also.

G. EIFRIG, ADDISON, ILL.

BIRD RECORDS.—The following records which I made in the early part of the present year may be of interest to some readers of THE OTTAWA NATURALIST.

1911

Jan. 5—Yarmouth, N.S., flock of Bluebirds.
21—Meteghan, N.S., Gold-crowned Kinglet.
Feb. 2— do Robin.
18—Weymouth, N.S., Robin.
19— do Robin.
23— do Two Meadowlarks.
24— do Robin.
26— do Meadowlark.
Apl. 13—St. Stephen, N.B., Bluebird.
14— do Red-winged Blackbird.

Although only one date for Golden-crowned Kinglet is mentioned above, I afterwards saw these birds abundantly along the shore of Digby and Yarmouth counties in Nova Scotia, where they were feeding on weed seeds.

G. E. SANDERS.

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FAUNA OTTAWAENSIS.

Order Lepidoptera: Superfamily Geometroidea.

By Arthur Gibson.

As a contribution towards the preparation of the Catalogue of the Insects of Canada and Newfoundland, which was recently outlined in *The Canadian Entomologist* and *The Ottawa Naturalist*, the following list of the Geometridæ which have been found in the Ottawa district is presented. It has taken a considerable number of years to collect the species here recorded, and the list is, I think, a fairly complete one of these insects which occur in this neighborhood. The late Dr. James Fletcher collected many of the specimens and much material has been gathered together by Mr. C. H. Young, of the Geological Survey Department, who collected extensively at Meach Lake. To the Rev. G. W. Taylor we are indebted for the determination of many of the species. Recently the writer has received help in the identification of certain species from Mr. John A. Grossbeck, of the American Museum of Natural History, New York, and Mr. A. F. Winn, of Montreal.

Family Geometridæ.

Subfamily Hydriomeninæ.

Dyspteris abortivaria H.-S. 28 May, 1901, (Young); 3 June, 1903, (Fletcher).

Nyctobia limitaria Walk. 25 April, 1901; 28 April, 12, 13 May, 1906; 16, 18 May, 1905, (Young); 26 May, 1899, (Gibson); 4 June, 1906, (Fletcher), 24, 30, 31 May, 1 June, 1906, (Taylor).

Nyctobia viridata Pack. 17 May, 1906, (Young); 23 May, 1903, (Gibson); 4 June, 1906, (Fletcher).

Chlorosea strolituraia Walk. Bred 9 April, 1906; 10 May, 1901, (Gibson); 18 June, 1906, (Fletcher).

Rachela bruceata Hulst. 2 Oct., 1900; 4 Nov. 1905, (Gibson).

Alsophila pometaria Harr. 3 Nov., 1900, (Gibson).

Eulule mendica Walk. 24 June, 1899, 29 June, 1906; 13 July, 1907, (Gibson).

Talledega montanata Pack. 12 May, 1901, (Young).
Talledega tabulata Hulst. 12 May, 1901, (Young); 19 May, 1904, (Gibson), 30 May, 1 June, 1906, (Taylor).
Nannia refusata Walk. 10 June, 1908, (Letourneau).
Heterophleps triguttaria H.-S. 17 June, 1899, (Young); 11 July, 1907, (Gibson); 13 July, 1905, (Fletcher).
Eupithecia luteata Pack. 19 April, 1905, (Young).
Eupithecia palpata Pack. 25 May, 1905, (Fletcher); 3 June, 1906, (Gibson); 10 June, 1906, (Young).
Eupithecia ornata Hulst. 24 April, 4 May, 1906, (Young).
Eupithecia interruptofasciata Pack. Larvæ found on *Juniperus communis* L., moths emerged Sept. 7, 1904, (Gibson).
Eupithecia albicapitata Pack. 5 June, 1904, (Young).
Eupithecia latipennis Hulst. 4 June, 1887; 9, 19 June, 1906; 20 June, 1905; 27 June, 1907, (Fletcher); 14 June, 1906; 23 June, 1908, (Gibson); 15 June, 1906, (Young), 1 June, 1906, (Taylor).
Eupithecia plumbaria Hulst, 24 May, 1906, (Taylor).
Eupithecia gibsonata Taylor. 9 June, 1903, (Young).
Eupithecia grata Taylor. 5 June, 1906, (Young).
Eupithecia fasciata Taylor. 28 June, 1906, (Gibson).
Eupithecia fumata Taylor. 9 June, 1906, (Young).
Eupithecia packardata Taylor. 7 Aug., 1906, (Young).
Eupithecia fumosa Hulst. A single specimen taken by Dr. Fletcher on 3 June, 1904, was named *fumosa*? by Rev. G. W. Taylor.
Eupithecia coagulata Gn. 19 May, 1905; 23 June, 1908, (Gibson).
Eupithecia casloata Dyar. 5 Aug., 1905, (Young).
Eupithecia youngata Taylor. 7 June, 20 July, 1905, (Young).
Eupithecia fletcherata Taylor. 3 Aug., 10 Sept., 1906, (Young).
Eupithecia raveocostaliata Pack. 17 May, 1904, (Young).
Eucymatoge intestinata Gn. 16 May, 3 June, 1903; 26 May, 1904; 23 June, 1905; 3 July, 1906, (Fletcher); 10 June, 1904, (Young); 2 June, 1906, (Taylor).
Euchoeca inornata Hulst. 29 April, 1903, (Young); 22 May, 1900, (Gibson).
Euchoeca comptaria Walk. 1, 11, 12 May, 1899, (Gibson); 16 May, 1900; 18 May, 1905; 4 June, 1906, (Fletcher); 29 June, 1903, (Young).
Trichodezia albovittata Gn. 26 May, 1 June, 1906, (Taylor), 29 June, 1904, (Young); 9 Aug., 1904, (Gibson).
Trichodezia albifera Walk. 13 June, 1907, (Gibson); 29 June, 1905; 13 Aug., 1906, (Young).
Epirrita dilutata D. & S. 23 Sept., 3 Oct., 1905, (Young).
Hydria undulata L. Reared from cherry 3-15 June, 1904, (Gibson); 26 June, 1900, (Young).

Eustroma diversilineata Hbn. Emerged 13, 16 June, 1900; 14 Aug., 1900; 14 Aug. 1903, (Gibson); 14 Aug., 1900, (Young); 12 Aug., 1904, (Fletcher).

Eustroma populata L. 9, 18 July, 1905, (Young).

Neoleuia xylina Hulst. 18 July, 1904; 19 July, 1906, (Young).

Rheumaptera hastata L. 18 May, 1903, (Young); 24 May, 2 June, (Taylor), 26 June, 1906, (Gibson).

Rheumaptera sociata Bork. 30 May, 4 June, 1904; 14 June, 1907; 16 Aug., 1904, (Fletcher); 4, 25 June, 1906; 14 June, 15 July, 1907; 9 Aug., 1904, (Gibson).

Rheumaptera georgii Hulst. 21 July, 1906, (Young).

Perenaptilata fluviata Hbn. 28 July, 1908; 16 Aug., 22 Sept., 1900, (Gibson); 15 Aug., 1899; 18 Aug., 1900, (Young).

Entephria aurata Pack. 27 June, 1903, (Young).

Mesoleuca ruficillata Gn. 29 May, 3 June, 1899, (Gibson); 31 May, 1899, (Young); 1 June, 1906, (Taylor), 5 June, 1908, (Fletcher).

Mesoleuca lacustrata Gn. 27 May, 1900, (Young); 1 June, 1906, (Taylor), 9 June, 1906; 24 June, 1905; 24 June, 6, 11 July, 1907, (Gibson); 14 June, 1907; 1 July, 1906, (Fletcher).

Mesoleuca intermediata Gn. 18 May, 19 July, 1904; 10 June, 1901, (Young); 14 June, 1899, (Gibson); 17 Aug., 1906, (Fletcher).

Mesoleuca truncata Hfn. 30 July, 1903, (Young).

Mesoleuca silaceata Hbn. 28 May, 1900, (Gibson); 2 June, 1898; 27 July, 3 Sept., 1904; 12 Aug., 1903, (Young); 16 Aug., 1905, (Fletcher).

Mesoleuca hersiliata Gn. 12 June, 1908, (Fletcher); 25 June, 1899, (Gibson); 1 July, 1903, (Young).

Mesoleuca vasiliata Gn. 18, 28 April, 9, 15, 29 May, 1899, (Gibson); 20 April, 1900, (Young); 26 May, 1906, (Taylor).

Hydriomena autumnalis Strom. 28 May, 1900, (Young); 1 June, 1906, (Taylor), 3 June, 1908; 12 July, 1906, (Fletcher); 19 June, 1908, (Gibson).

Hydriomena basaliata Walk. 16 July, 1905; 17 July, 1904, (Young); 20 July, 1905, (Gibson).

Hydriomena contractata Pack. 10 Sept., 1901, (Fletcher).

Hydriomena latirupta Walk. 21 April, 1902, (Young); 30 Sept., 1900, (Gibson).

Hydriomena multiferata Walk. June.

Triphosa indubitata Grt. 24 April, 21 Sept., 1900, (Young); 25 Oct., 1900, (Gibson); 31 May, 1906, (Taylor).

Cenocalpe magnoliata Gn. 1 June, 1906, (Taylor), 3 June, 1899; 10 June, 1903; 20 Aug., 1904, (Gibson); 5, 6, 8 June, 1906, (Fletcher); 10 June, 1908, (Letourneau).

Cenocalpe gibbocostata Walk. No date, (Fletcher). The species flies in early September.

Gypsochroa designata Hfn. 29 May, 9 June, 1899; 4 June, 1906; 20 Aug., 1904, (Gibson); 14 June, 1907, (Fletcher); 28 July, 1903, (Young).

Xanthorhoe ferrugata Clk. 13, 16 May, 1905; 4, 8, 9, 14, 21 June, 1906, (Fletcher); 27 May, 1900, (Young); 3 June, 1904; 23 July, 1899; 8 Sept., 1907, (Gibson).

Xanthorhoe planata Taylor. 19, 20, 30 June, 1904; 3 July, 1905, (Young).

Subfamily MONOCTENIINÆ.

Hæmatopsis grataria Fab. 31 May, 16 Aug., 1900, (Young); 15 Aug., 1907; 16 Aug., 1900; 30 Sept., 1900, (Gibson).

Subfamily STERRHINÆ.

Deptalia insulsaria Gn. 2 July, 1905; 18 Aug., 1906, (Young).

Cosymbia lumenaria Hbn. 22 July, 1905; 28 July, 1902, (Young); 16 Aug., 1904, (Gibson).

Synelys enucleata Gn. 9 June, 1904, (Gibson); 26 June, 1 July, 1904, (Young); 12 July, 1906, (Fletcher).

Leptomeris quinquelineata Pack. 8 June, 1903; 5 July, 1905, (Young).

Eois inductata Gn. 13 June, 1903, (Young); 14 June, 1899, (Gibson); 18 June, 1906, (Fletcher).

Subfamily GEOMETRINÆ.

Chlorochlamys chloroleucaria Gn. 12 June, 1901; 14 June, 1899; 16 Aug., 1900, 28 July, 1908, (Gibson); 28 Aug., 1908, (Fletcher). Slender green larva found on *Solidago canadensis*.

Nemoria pistaceata Gn. 25 May, 1901; 30 May, 1903, (Gibson); 28 May, 1904, (Young).

Nemoria subcroceata Walk. 8 June, 1907, (Gibson).

Eucrostes incertata Walk. 14 May, 1904, (Young); 21 May, 1904, (Gibson).

Synchlora cærata Fab. 24 July, 1902, (Young).

Aplodes mimosaria Gn. 29 April, 8 June, 1906; 18 June, 1907, (Fletcher); 24 May, 1900, (Young).

Aplodes rubrifrontaria Pack. 5 June, 1906, (Young).

Anaplodes rubromarginaria Pack. 8 June, 1906; 8 June, 1907, (Fletcher). Mr. Young has also taken the species.

Anaplodes remotaria Walk. 19 Aug., 1902, (Young).

Subfamily ENNOMINÆ.

Epelis truncataria Walk. 18 May, 1898, (Young); 25 May, 1903, (Gibson); 8 June, 1903, (Fletcher).

Epelis fasonii Minot. 8 June, 1903, (Fletcher); 20 June, 1908, (Gibson).

Eufidonia notataria Walk. 30 May, 1901; 9 June, 1908, (Gibson); 8 June, 1903, (Fletcher); 18 June, 1902, (Young); 26 June, 1904, (Metcalfe).

Orthofidonia exornata Walk. 1 June, 1905, (Taylor), 25 June, 1906, (Young).

Orthofidonia semiclusata Walk. 6 May, 1899, (Young); 30 May, 1908, 9 June, 1900, (Gibson); 14 June, 1907, (Fletcher).

Orthofidonia vestaliata Gn. 24 May, 1906, (Taylor); 30 May, 1908; 9 June, 1906, (Gibson).

Paxamalgamia pannularia Gn. 13 July, 1905, 10 Aug., 1906, (Fletcher); 19 July, 1903, (Young).

Gueneria basiaria Walk. 16 May, 1905, (Young); 31 May, 9 June, 1900; 14 June, 1907; 6 July, 1905, (Gibson); 4, 8 June, 1906; 13, 14 June, 1907, (Fletcher).

Deilinia variolaria Gn. 6 June, 1901; 12 July, 1904, (Young); 4 June, 1908, (Letourneau); 22 June, 1906, (Fletcher); 25 June, 1906, (Gibson).

Deilinia erythemaria Gn. 21 May, 22 July, 1904, (Young); 4 June, 1906, (Fletcher).

Deilinia liberaria Walk. 6 Sept., 1902, (Young).

Sciagraphia granitata Gn. 10 May, 12 July, 1900; 29 May, 1896; 3 June, 1899; 2, 9 June, 1906; 16, 27 June, 1907; 13 Aug., 1904, (Gibson); 27 May, 1903; 1 June, 1901, (Young); 8 June, 1903, (Fletcher); 21 May, 1908, (Letourneau).

Sciagraphia neptaria Gn. 1 June, 1905, (Young).

Sciagraphia continuata Walk. 23 July, 1900, (Gibson).

Sciagraphia atrofasciata Pack. 26 Aug., 1907, (Letourneau).

Sciagraphia mellistrigata Grt. 8 June, 1903, (Fletcher); 22 July, 1899, (Young).

Macaria labradoriata Moesch. 12 Aug., 1904, (Fletcher). Mr. Grossbeck, who examined this specimen, reported: "This species was described from a male and female from southern Labrador in 1883, and to my knowledge has never been rediscovered since. Your specimen is large for the species but otherwise fits Moeschler's description exactly."

Macaria bisignata Walk. 2, 3 July, 1906, (Fletcher).

Macaria glomeraria Grt. 29 April, 17 May, 1903, (Young).

Diastictis hulstiaria Taylor. 12 May, 1903, (Gibson).

Diastictis virginalis Hulst. 29 June, 1904, (Young).

Diastictis ribearia Fitch. Emerged 2 July, 1903, (Gibson); 19 July, 1903, (Young).

Diastictis sulphurea Pack. 12 July, 1902, (Young).

Diastictis brunneata Thunb. 6 July, 1903, (Young).

Diastictis inceptaria Walk. 23 July, 1900, (Gibson).

Diastictis evagaria Hulst. 8 June, 1903, (Young).

Diastictis subcrenata Walk. 30 July, 1905, (Gibson); 6 Aug., 1903, (Young).

Diastictis bilineata Walk. Larva on *Prunus pennsylvanica*, moth emerged 11 Aug., 1906, (Fletcher).

Diastictis inquinaria Hulst. 8 July, 1903, (Young).

Homochlodes fritillaria Gn. 21 May, 1904, (Young); 27 May, 1901; 19 June, 1907, (Gibson); 31 May, 1 June, 1906, (Taylor), 3 June, 1903; 19 June, 1907, (Fletcher).

Apocasia detersata Gn. 10 May, 1904; 25 May, 1908; 13, 14 June, 1907, (Gibson); 14 May, 1904; 27 May, 1905, (Young); 9 June, 1906, (Fletcher).

Apocasia defluata Walk. 16 May, 1900, (Young); 25 May, 1903; 27 May, 1901; 19 June, 1907, (Gibson); 1 June, (Fletcher).

Caripeta divisata Walk. 25 July, 1902, (Young).

Nepytia semiclusaria Walk. 30 Aug., 1899, (Young); 7 Sept., 1908, (Letourneau).

Alcis guttata Hulst. 20 June, 1894, (Fletcher). This specimen was so named by Mr. Grossbeck. In reporting upon it he says: "The species which I am quite certain is the one described by Hulst as *Alcis guttata* is very interesting. I was never quite certain that the two specimens on which the name was based really came from New York and Pennsylvania as Hulst said. They had a decidedly European aspect. The receipt of your specimen now seems to indicate, however, that the types were caught in this country."

Paraphia subatomaria Wood. 10 July, 1903, (Young); 20 Aug., 1906, (Gibson).

Spodolepis substriaria Hulst. 4 May, 1906, (Young).

Selidosema humaria Gn. 1 July, 1905; 21 July, 1903, (Young).

Cleora pampinaria Gn. 1 June, 1905 (Young).

Cleora takenaria Pears. 20 July, 1905, (Gibson); 28 June, 1905; 16 July, 1903, (Young); 24 July, 1905, (Fletcher).

Melanolophia canadaria Gn. 5 May, 1902; 17 May, 1905; 4, 8, June, 1906; 18 June, 1907, (Fletcher); 17, 18 May, 1905; 8 June, 1906; 12 June, 1899; 18 June, 1907, (Gibson); 7 June, 1903, (Young).

Æthaloptera anticaria Walk. 11 May, 17 June, 1905, (Young), 2 June, 1906, (Taylor), 4 June, 1906, (Fletcher).

Ectropis crepuscularia D. & S. 10 May, 1911; 2, 4 June, 1899; 20 Aug., 1904, (Gibson); 17 May, 1906; 25 July, 1903, (Young), 31 May, 1 June, 1906, (Taylor).

Lycia ursaria Walk. 13 April, 1902; 29 April, 13 May, 1903, (Gibson).

Lycia cognataria Gn. 8, 12 June, 1899, 18 June, 1904, (Gibson).

Nacophora quernaria S. & A. 20 June, 1906, (Young).

Paleacrita vernata Peck. 16, 20 April, (Gibson); 26 April, 1905, (Young).

Phigalia titea Cram. 20, 21 April, 1899, (Gibson).

Erannis tiliaria Harr. 8 Oct., 1900; 11-20 Oct., 1911; (Gibson); 14 Oct., 1899, (Young).

Cingilia catenaria Dru. 7 Sept., 1902, (Young); 26 Sept., 1899; (Gibson).

Cingilia rubiferaria Swett. 1 Oct., 1902, (Gibson).

Anagoga pulveraria Linn. 17 May, 1903; 24 May, 1906, (Young); 30 May, 1906, (Gibson); 14 June, 1907, (Fletcher).

Sicya macularia Harr. 10 July, 1904, (Young); 20 July, 1905, (Gibson).

Therina endropiaria G. & R. 18 May, (Fletcher); 8 June, 1903; (Gibson); 9 June, 1903, (Young).

Therina athasiaria Walk. 17 June, 1906, (Young).

Therina fiscellaria Gn. 28 Aug., 1904; 3 Sept., 1903; 7 Sept., 1901, (Young); 22 Aug., 6 Sept., 1905; 12 Sept., 1908, (Gibson); 19 Sept., 1907, (Fletcher).

Metrocampa perlata Gn. 17 June, 24 Aug., 1903, (Young); 20 Aug., 1904; 12 Sept., 1903, (Gibson).

Eugonobapta nivosaria Gn. 7 July, 1902, (Young).

Ennomos subsignarius Hbn. 14 July, 1899; 24, 25 July, 1908, (Gibson); 1 Aug., 1906, (Fletcher).

Ennomos magnarius Gn. Em. 9, 15 July, 1904; 7 Sept., 1900; 15, 23 Sept., 1903; 23 Sept., 1899, (Gibson); 4 Sept., 1900, (Young); 24 Sept., 1907, (Fletcher).

Xanthotype crocataria Fab. 27 June, 1906; 6 July, 1905, (Fletcher); 28 June, 1899; 12 July, 1900, (Young); 6 July, 1905; 7 July, 1906, (Gibson).

Plagodis serinaria H.S. 18 May, 1903, (Young); 18 May, 1904, (Gibson); 18 May, 1905, (Fletcher), 26 May, 1906, (Taylor).

Plagodis keutzingi Grt. 26, 31 May, 1906, (Taylor), 2 June, 1902, (Young).

Plagodis alcoolaria Gn. 17 May, 1903, (Young.)

Plagodis keutzingaria Pack. 24 May, (Gibson).

Plagodis phlogosaria Gn. 14 July, 1899; 20 July, 1905, (Gibson); 24 July, 1902, (Young).

Hyperitis amicaria H.-S. 26, 31 May, 1906, (Taylor); 27 May, 1900, (Young).

Ania limbata Haw. 18 July, 1906; 13 July, 1900; 20 July, 1905; 31 Aug., 1899, (Gibson); 19 July, 1903, (Young).

Gonodontis hypochraria H.-S. 28 May, 1899, (Young); 2, 5 June, 1899; 12 June, 1904, (Gibson); 3, 8 June, 1903, (Fletcher).

Gonodontis duaria Gn. 29 May, 1901; 25 May, 1903, (Gibson); 31 May, 1900; 13 June, 1906, (Young).

Gonodontis obfirmaria Hbn. 30 May, 1901; 25 May, 1903, (Gibson); 18 June, 1902, (Young).

Euchlaena obtusaria Hbn. 25 June, 1900, (Young).

Euchlaena effectaria Walk. 28 June, 1904, (Young).

Euchlaena johnsonaria Fitch. 6 July, 1905, (Gibson).

Euchlaena astylusaria Walk. 18 June, 1903, (Young).
Euchlaena pectinaria D. & S. 6, 20 June, 1901, (Gibson).
Euchlaena sirenaria Strk. 8 June, 1903, (Young). When determining this specimen, Mr. Taylor reported: "May be only a variety of *pectinaria* but it is very different in apperance to our western form."
Eutrapela alciphearia Walk. 24 May, 1906, (Young.)
Eutrapela hentaria Grt. 24 May, 1906, (Young).
Metanema inatomaria Gn. 29 May, 1905, (Fletcher); 6 July, 1903, (Young); 20 July, 1905, (Gibson).
Metanema determinata Walk. 30 June, 1903, (Young).
Priocycla armataria H.-S. 24 June, 1900, (Young).
Pero honestarius Walk. 31 May, 1902, 10 Aug., 1900, (Young); 5 June, 1906, (Fletcher); 3, 22 June, 1906, (Gibson).
Caberodes confusaria Hbn. 7 July, 1902, (Young); 6 July, 1905, (Fletcher); 14, 24 July, 1899; 20 Aug., 1904, (Gibson).
Caberodes majoraria Gn. 7 June, 1903, (Young).
Tetracis crocallata Gn. 25 May, 1906, (Taylor), 3 June, 1903, (Fletcher); 3 June, 1899, (Young).
Sabulodes arcasaria Walk. 27 May, 1901, (Gibson); 10 June, 1904, (Young).
Sabulodes lorata Grt. 3 June, 1903; 12 June, 1904; 9 June, 1908, (Fletcher); 5 June, 1903, (Gibson); 10 June, 1900, (Young).
Sabulodes transversata Dru. 7 July, 1903, (Young); 5 Aug., 1899; 14 Aug., 1903; 18 Aug., 1904, (Gibson); 9 Aug., 1906; 12 Aug., 1904, (Fletcher); 26 Aug., 1907, (Baldwin).
Abbotana clemataria S. & A. No date, (Fletcher).

Family BREPHIDÆ.

Brephos infans Moesch. 29 April, 1900, (Young); April, 2 May, 1896, (Fletcher).

PLANTS CAUSING SKIN IRRITATIONS.

The susceptibility of different individuals towards irritant juices of certain plants may be as different as the individuals themselves. That is to say, the juices of some plants may cause serious Dermatitis in a number of people, while others may not be affected in the slightest degree. Curiously enough all people alike seem to be affected by the sting of the common nettles; while the most common of all skin irritating plants, Poison Ivy, does not seem to affect all persons; even those susceptible may be affected in varying degrees. This peculiar tendency may be termed idiosyncrasy. Some persons cannot partake of strawberries, asparagus and other fruits or vegetables without their being troubled by Urticaria or like skin rashes. This is their idiosyncrasy, their peculiarity of constitution.

There are a large number of plants possessing such irritant juices. Some are well-known, like the Nettles, Poison Ivy, and the much favoured little Primula (*P. obconica*), which is so grateful a flowering plant during the winter months in our conservatories. Experiments have been made with a number of closely related primulas, all members of the *P. Sinensis* section. The Chinese Primula itself has caused considerable irritation to persons handling the plants. The leaves of this group of plants are covered with fine glandular hairs, which contain the irritant juice. It has been found that *Primula Sieboldii* Morr., *P. Arendsii* Pax., *P. Mollis* Hook., may also cause similar irritations. Strangely, however, people unsusceptible to the irritation of *P. obconica* have often suffered considerable annoyance from these latter species.

In examining the glandular hairs of these and similar plants I once had the misfortune to sting myself very severely with a Laportea from Australia (*L. gigas*). For weeks my arm was stiff and swollen, and for months—even years—as soon as the hand affected by the sting was put into cold water a severe pain shooting right through the limb was felt. There grows on Parliament Hill, right in the centre of Ottawa, another member of the same genus, (*L. canadensis*), which has a decidedly unpleasant action upon some people. One of the men at the Experimental Farm still bears large scars due to the effects of this plant.

Certain cruciferous plants with large brittle hairs cause a smarting effect like Stinging Nettles, but much less severe. The fine hairs covering the inside walls of some rosaceous fruits also may cause a very troublesome irritation to the unprotected skin. The glandulous hairs covering leaves and stems of some of our wild orchids, especially *Cypripedium pubescens*, *C. spectabile*, and *C. parviflorum* contain a secretion which acts much like *Primula obconica*.

Some records exist of an eczema-like inflammation of the skin caused by handling Common Ivy (*Hedera Helix*).

Humea elegans is another plant which causes frequent skin irritations. It is a compositous biennial from Australia and is one of the most beautiful herbaceous perennials, though little known in Canada.

No doubt there exist a number of other plants having similar properties, but those mentioned have been repeatedly recorded as having a decidedly disagreeable action on some persons. A saturated solution of lead acetate in alcohol added to an equal quantity of glycerine has been proven to be of the greatest value in relieving the often unbearable irritations.

H. T. GUSSOW.

SOME CANADIAN SENECIOS.

By J. M. GREENMAN, CHICAGO, ILL.

In the preparation of a monograph of the North American species of the genus *Senecio*, the writer, through the kindness of Messrs. JOHN and JAMES M. MACOUN, has had the privilege of studying the entire representation of this genus in the herbarium of the Geological Survey of Canada. This collection is especially rich in northern forms, and in many instances excellent series of specimens illustrate individual species of northern distribution. Several plants, however, have been found which hitherto seem not to have been described; these, associated with material from the Gray Herbarium and the herbarium of the Field Museum of Natural History, are characterized and recorded, as follows:—

SENECIO BURKEI, sp. nov.

Herbaceus perennis; caulibus erectis 3–9 dm. altis simplicibus vel rarius ramosis striatis glabris; foliis inferioribus petiolatis ovato-oblongis 2–10 cm. longis 1–4.5 cm. latis ad apicem obtusis vel rotundatis basi cuneatis vel subtruncatis, foliis superioribus irregulariter inciso-dentatis vel pinnatifidis sessilibus et subamplexicaulibus et sursum gradatim reductis; inflorescentiis corymboso-cymosis; capitulis plerumque numerosis 10–12 mm. altis radiatis; bracteis involucri circiter 21 lineari-lanceolatis 6–8 mm. longis glabris vel floccoso-tomentulosis plus minusve purpurascentibus; floribus femineis ligulatis ca. 12; floribus disci numerosis (50–60); achaeniis glabris. Collected on the "east slope of the Rocky Mountains" by *Burke* (hb. Gray) type. ALBERTA: by the reservoir, Banff, 30 October, 1899, *N. B. Sanson* (hb. Geol. Surv. Canada, no. 22288); vicinity of Banff, July, 1906, *N. B. Sanson*, (hb. Geol. Surv. Canada, without number, and hb. Field Museum, cat. no. 288351); Banff, 28th July, 1904, *Miss Edith M. Farr* (hb. Field Museum, cat. no. 189413); mountain slopes, Crows Nest Pass, 31 July, 1887, *J. Macoun* (hb. Geol. Surv. Canada, no. 22785 in part). BRITISH COLUMBIA: open thickets, Spences Bridge, 31 May, 1889, *J. Macoun* (hb. Geol. Surv. Canada, no. 14811 in part); shaded banks, mouth of Silica Creek, Chilliwack River, 29 June, 1901, *J. M. Macoun* (hb. Geol. Surv. Canada and hb. Gray, no. 26685); on a bog in Chilliwack Lake, 19 July, 1901, *J. M. Macoun* (hb. Geol. Surv. Canada, no. 26682*a*); in a marsh east of Chilliwack Lake, 25 July, 1901, *J. M. Macoun* (hb. Geol. Surv. Canada and hb. Gray, no. 26682); foot of a snow slide, Middle Creek, Chilliwack River, 2 August, 1901, *J. M. Macoun* (hb. Geol. Surv. Canada, no. 26681); in thicket

by stream at 150 mile house, Cariboo Road, 15 July, 1906, *E. Wilson*, no. 700 (hb. Geol. Surv. Canada); Sophie Mt., 17 and 20 July, 1902, *J. M. Macoun* (hb. Geol. Surv. Canada and hb. Gray, nos. 64990, 64991); low ground, Skagit Valley, alt. 770–925 m., 10 July and 21 August, 1905, *J. M. Macoun* (hb. Geol. Surv. Canada and hb. Gray, nos. 69358, 69359). ROCKY MOUNTAINS: cold moist slopes, Kicking Horse Pass, 13 September, 1884, *J. Macoun* (hb. Geol. Surv. Canada, no. 14818); river margins, Silver City, 7 August, 1885, *J. Macoun* (hb. Geol. Surv. Canada, no. 14772); swamps, Kicking Horse Lake, alt. 1540 m., 10 August, 1890, *J. Macoun* (hb. Geol. Surv. Canada, no. 14810). MONTANA: open ground, shore of Lake McDonald, alt. 300 m., 25 July, 1901, *F. K. Vreeland*, no. 964 (hb. Geol. Surv. Canada, no. 67117).

SENECIO MULTNOMENSIS, sp. nov.

Herbaceus perennis; caulibus erectis vel plus minusve flexuosis 3–7 dm. altis in axillis foliorum floccoso-tomentulosis cetera glabris; foliis inferioribus petiolatis oblongo-oblanceolatis 4–15 cm. longis 0.8–2 cm. latis utrinque glabratis apice obtusis vel rotundatis crenato-serratis vel plus minusve lyrato-lobatis cum remote lobis, superioribus sessilibus et subamplexicaulibus; inflorescentiis terminalibus corymbo-cymosis, pedunculis plerumque elongatis; capitulis 10–13 mm. altis radiatis; squamis involucri campanulati circiter 21 lineari-lanceolatis 8–10mm. longis acutis pallide viridibus glabris, apice penicillatis; floribus femineis ligulatis ca. 13, ligulis flavis; floribus disci ca. 60; achaeniis glabris. OREGON: Multnomah County, June, 1877, *T. J. Howell*, no. 221 (hb. Gray) type; without locality, June, 1877, *Howell* (hb. Field Museum, cat. no. 69229); low flats, Cascades, coll. of 1868-9, *A. Kellogg* and *W. G. Harford* no. 537 (hb. Gray). BRITISH COLUMBIA: Field, 6 August, 1904, *Miss Edith M. Farr* (hb. Field Museum, cat. no. 189411); Trail, 18 June, 1902, *J. M. Macoun* (hb. Geol. Surv. Canada and hb. Gray, no. 64992). SASKATCHEWAN: without further locality, Palliser's Brit. N. Am. Expl. Expedition, coll. of 1857, *E. Bourgeau* (hb. Gray). A species related to *S. Burkei* Greenm., but distinguished readily from it by the more or less flexuous stem, relatively narrow oblong-oblanceolate basal leaves, remotely lobed lower stem-leaves with broad rounded sinuses, and usually long pedunculate heads. From *S. Balsamitae* Muhl. to which certain of the above specimens have been referred by some authors, *S. multnomensis* is separated easily by the larger heads and longer involucral bracts.

SENECIO FARRIAE Greenman, Bot. Gaz. 42: 147, 1906; Contr. Bot. Lab. Univ. Pa. 3: 74, 1907. Through the courtesy

of Mr. J. M. Macoun the writer has had an opportunity to study an excellent lot of about a hundred specimens of this species, which were collected in the vicinity of Banff, Alberta, by Mr. N. B. Sanson, in July of 1906. Several mounted specimens were also found by the writer along with other material of the genus kindly sent to him for examination from the herbarium of the Canadian Geological Survey. The entire series of specimens at hand shows naturally a greater range of variation than the limited material on which the species was founded; nevertheless the essential characters ascribed originally to the species are retained throughout, and the following additional data may be recorded: Stems 1–3 dm. high, lowermost leaves ovate to slightly obovate 1–4 cm. long, 1–2.5 cm. broad; ray-flowers 10–14; disk-flowers 50–60. In addition to Miss Farr's specimen, cited in the original publication of the species, the following collections well represent the species. Alberta: damp places, Red Deer, *H. H. Gaetz*, coll. of 1895, (hb. Geol. Surv. Canada, no. 11622); in grass along Bragg's Creek, Elbow River, 26 June, 1897, *J. M. Macoun* (hb. Geol. Surv. Canada, no. 22784); crossing of McLeod's River, 19 June, 1898, *W. Spreadborough* (hb. Geol. Surv. Canada, no. 19725); Devil's Head Lake, alt. 1385 m., 13 July, 1899, *N. B. Sanson* (hb. Geol. Surv. Canada, no. 22125); vicinity of Banff, July, 1906, *N. B. Sanson* (hb. Geol. Surv. Canada, without number; hb. Field Museum, cat. no. 288350); Crows Nest Lake, 9 July, 1883, *Dr. G. M. Dawson* (hb. Geol. Surv. Canada, no. 14800 in part); Banff, 28 June, 1905, *Miss Edith M. Farr* (hb. Field Museum, cat. no. 189412); Sulphur Springs, Banff, alt., 1415 m., 11 June, 1906, *F. K. Butters* and *C. O. Rosendahl*, no. 1324 (hb. Field Museum, cat. no. 276752).

Senecio Balsamitae Muhl. in Willd. Sp. Pl. 3: 1998, 1800.

A very interesting suite of specimens collected by Mr E. Wilson in the Kamloops District, British Columbia, July, 1906, nos. 686, 672 (hb. Geol. Surv. Canada) are indistinguishable from eastern forms of this species secured by Professor M. L. Fernald on the Gaspé Peninsula, Province of Quebec, in 1904.

Senecio Balsamitae Muhl., var. thomsoniensis, var. nov.

Herbaceus perennis; caulibus erectis simplicibus 3–4.5 dm. altis floccoso-tomentosis; foliis inferioribus petiolatis oblongo-oblanciolatis 3–7 cm. longis 5–12 mm. latis obtusis crenato-serratis juventate utrinque floccoso-tomentosis plus minusve glabratis, foliis superioribus petiolatis vel sessilibus usque ad 10 cm. longis pinnato-lobatis, lobis remotis; inflorescentiis tomentosis; capitulis radiatis per anthesem 6–8 mm. altis. British Columbia: in grassy thickets fifty miles up North Thompson River, 16 June, 1889, *J. M. Macoun* (hb. Geol.

Surv. Canada, no. 14822); Lake Osoyoos, 31 May, 1905, *J. M. Macoun* (hb. Geol. Surv. Canada and hb. Gray, no. 69357).

This plant was taken at first to represent an undescribed species; and while it differs from typical *S. Balsamitae* Muhl. in being at first floccose-tomentose throughout, and but tardily glabrate, and in having a rather leafy stem, yet these differences do not seem strong enough to merit a specific characterization.

SENECIO MANITOBENSIS, sp. nov.

Herbaceus perennis; caulibus erectis 2–3 dm. altis simplicibus vel interdum ramosis glabris vel in axillis foliorum subtomentosis, foliis sub-carnosis internodiis petiolatis oblanceolatis 2–7 cm. longis 2–12 cm. latis serratis vel inaequaliter dentato-lobatis basi sensim angustatis utrinque glabris, foliis superioribus petiolatis vel sessilibus lanceolato-pinnatifidis, laciniis angustissimis remotis; inflorescentiis corymboso-cymosis; capitulis per anthesim 8–10 mm. altis ligulatis; involucris campanulatis glabris, squamis involucri plerumque 21 lanceolatis 7 mm. longis acutis glabris quam floribus disci brevioribus; floribus femineis ligulatis 6–10, ligulis flavis; floribus disci 45–60; achaeniis 3–3.5 mm. longis, costis alternis hirtellis. MANITOBA: on "sand hills at Brandon and Old Wives Lakes, N.W.T. west of Brandon." 22 June, 1881, *J. Macoun*, no. 22 (hb. Gray), type; on open prairie, south of Sewell, 12 June, 1876, *J. Macoun* (hb. Geol. Surv. Canada, no. 12232); Gravelly or rocky places, Flat Creek, "N.W.T.," 20 June, 1880, *J. Macoun*, no. 103 (hb. Geol. Surv. Canada, no. 14796); Lake Winnipeg Valley, *Bourgeau*, coll. of 1857 (hb. Gray); Stewart's Lake Mountain, 21 June, 1875, *J. Macoun* (hb. Geol. Surv. Canada, no. 14777 in part); north of Carberry, 14 June, 1906, *J. Macoun* and *W. Herriot* (hb. Geol. Surv. Canada and hb. Field Museum, no. 69753); on sand hills, eight miles west of Petrel, 17 June, 1906, *J. Macoun* and *W. Herriot* (hb. Geol. Surv. Canada and hb. Field Museum, no. 69755). NORTH DAKOTA: on sand hills, McHenry County, 13 July, 1899, *J. Lunell*, no. 24 (hb. Gray).

A species somewhat intermediate between *S. plattensis* Nutt. and *S. Balsamitae* Muhl. It is distinguished from the former by the narrowly oblanceolate lower leaves and by the glabrous character of stem and foliage. From the latter it is distinguished by the thicker, firmer texture of the foliage, the serrate-dentate basal leaves, and by the pubescence of the achenes.

SENECIO WILLINGII, sp. nov.

Herbaceus perennis subglaucentes; caulibus erectis 2.5–3 dm. altis glabris striatis foliaceis; foliis oblongo-lanceolatis 3–12 cm. longis 0.7–2 cm. latis crenato-serratis vel multipinnato-

lobatis juventate subtus in costis et nerviis et marginibus petioli floccoso-tomentulosis denique glabratis, lobis oblongis ad apicem rotundatis integris vel obtusodentatis; inflorescentiis dense corymboso-cymosis; capitulis 8–10 mm. altis radiatis; involucris campanulatis calyculatis parce floccoso-tomentulosis glabratis, squamis involucri ca. 21 lineari-lanceolatis 6–7 mm. longis acutis; floribus femineis ligulatis ca. 12, ligulis flavis; floribus disci 60–70; achaeniis glabris. ALBERTA: near Olds, August, 1894, *W. W. Willing* (hb. Geol. Surv. Canada, nos. 14843, 6063; fragment and photograph in hb. Field Museum). Here also is referred doubtfully a specimen collected in gravelly soil at Ninga, Manitoba, 1 June, 1908, *B. J. Hales*, no. 24 (hb. Geol. Surv. Canada).

This species stands nearest to *S. plattensis* Nutt., but differs in its subglaucus character, smooth and strongly striated stem and glabrous achenes.

SENECIO CANUS Hook., var. ACRAEUS, var. nov.

Caulis 3–4 dm. altus; foliis oblanceolatis vel lanceolatis subintegris vel irregulariter inciso-dentatis 4–10 cm. longis 0.5–1.5 cm. latis juventate utrinque lanato-tomentosis supra denique glabratis; inflorescentiis corymbo-cymosis, pedunculis per longis. SASKATCHEWAN: Spy Hill, 23 June, 1879, *J. Macoun*, no. 52 (hb. Gray), type; on dry gravelly slopes, Spy Hill, "N.W.T.," 26 June, 1879, *J. Macoun* (hb. Geol. Surv. Canada, no. 14837 in part).

The variety here described is a somewhat taller plant than the species proper with more deeply cut stem-leaves and with a tendency for the upper leaf-surface to become more or less glabrous; furthermore the inflorescence is more open and has relatively long branches.

NOTES ON NATIVE ORCHIDS.

BY CHARLES MACNAMARA, ARNPRIOR, ONT.

Among other peculiarities of our native orchids may be mentioned the surprising manner in which a species will suddenly appear in some place where it was rare or unknown before, only to disappear again in the next year or two. No doubt all plants have their "off" years, but why perennials like the orchids should disappear as suddenly and completely as they do, it is hard to say. Their unexpected appearance is probably due to the exceedingly light nature of their seeds, which a fortuitous wind may carry long distances. But whatever the cause, this remarkable habit adds great zest to orchid hunting, for

one never knows what good fortune may be waiting just around the corner, even in a locality one knows well. Thus, last summer, while walking along a woodland path which I had followed hundreds of times before, I was delighted to find a vigorous plant of the rather rare *Corallorrhiza striata* growing so close to the beaten track that I marvel how it escaped injury from passersby. Another such instance is that of a specimen of the somewhat scarce *Microstylis unifolia* which suddenly appeared this summer in the moss at the side of a road I have travelled for years. I had never before seen this species within four or five miles of the place. The little plant would certainly not have survived the summer in this spot, for the moss it grew in had begun to dry up, and its single leaf was drooping pathetically when I found it. I cut away a large piece of the surrounding moss and transplanted plant and all in a cool, damp swamp. When I revisited it some days later, its leaf had stiffened up again and two of its ovaries had begun to swell. Additional instances of fortunate finds of the kind might be cited, such as *Liparis Loeselii* appearing unexpectedly in a haunt of *Habenaria hyperborea* which I had visited scores of times before, but there is the other side, already mentioned, to this singular orchidaceous habit. If they sometimes delight the botanist by their unhoped-for apparition, they can also disappoint him sadly on occasion. In the summer of 1906, I photographed *Habenaria orbiculata* which that year was very plentiful—for an orchid. The negatives were not entirely satisfactory, and I determined to photograph the plant again next season. But alas, I have never since come across a good specimen in blossom in this vicinity. A few pairs of the flat shining leaves can be found, but they put forth no flowers. The handsome *Habenaria psycodes*, too, has disappeared entirely from a swamp where it grew two years ago. In a beaver meadow which always heretofore contained a large number of *Spiranthes cernua*, this year I can find only two or three; and I have sought diligently but in vain for two plants of *Microstylis monophyllos* which grew last year in a cedar swamp near Marshalls Bay. Neither the original plants, which showed healthy signs of setting seed when I last saw them, nor any of their progeny can now be found.

Some species, however, are quite constant in their habitat. I know a flourishing *Habenaria bracteata* which has flowered every year for six years now. This year, though, its insect guests seem to have all sent in their regrets, for not one of its flowers has set seed. The Cypripediums, too, can generally be found in the same place year after year. This is true more particularly of *C. parviflorum* and *C. hirsutum* (*spectabile*), which, growing as they do in mosquito-infested swamps, are

pretty safe from the casual flower-picker; but the beautiful *C. acaule*, inhabiting open woods is not so protected, and frequently falls a victim to passersby. Consequently it is becoming decidedly scarce in populated districts. This, however, is due to an accident of civilization, and not to any natural exigency.

The peculiar flowering habits of *Epipactis* have been frequently noticed before. One may sometimes find large numbers of their beautifully veined leaves, but not a single blossom. The dozen or so plants of *E. pubescens* which I know of around here blossomed freely for several years past until this summer, when only one plant put forth a flowering spike. On the other hand, in a small swamp where I never saw more than two or three of the plants in blossom before, this year I counted 132 fine spikes of *E. repens*, and later observation shows that they have nearly all set seed.

This raises the question as to what happens to the immense quantity of seeds which an orchid produces every year. A rough count of the seeds in a capsule of *Cypripedium parviflorum* showed the number to be about 10,000. A single capsule of *Habenaria hyperborea* easily contains 2,000 seeds, and as a large plant bears some 15 or 20 such capsules, the total number of seeds to a plant is 30,000 to 40,000. A well grown specimen of the small *Liparis Loeselii* produces 60,000 seeds in its six or eight capsules. *Microstylis unifolia* never seems to get more than two to four of its blossoms fertilized, but each of its tiny capsules contain some 1,200 seeds. Large as these figures seem, they are nothing to the almost incredible profusion of seeds grown by some tropical species. A German botanist found 1,756,440 seeds in a single capsule of a *Maxillaria*, and the plant sometimes bore half a dozen such capsules. Darwin estimated the seeds produced annually by an European species of *Orchis* at 186,000, and shows that if all the seeds grew, by the third generation the descendants of a single plant would be sufficient to "clothe with one uniform green carpet the entire surface of land throughout the globe." But, in spite of this immense production of seed, orchids, even in the tropics are never very plentiful when compared with other families, and in this country they are always decidedly scarce. As they are practically all cross-fertilized the number of bad seeds must be very small, and admitting that they are somewhat fastidious in their various habitats—the saprophytic coral-roots, for instance, requiring a quite special soil—one would nevertheless imagine that a dozen or so at least of the many thousands of seeds set free by even a single plant would find some suitable soil near the parent. But, nothing of the kind occurs. The same plants come up

year after year, but there is practically no increase in the always scanty number of individuals. In truth, orchids seem to have specialized too far or in the wrong direction. The marvellous apparatus they have developed to ensure cross-fertilization is only moderately successful. It was long ago noticed that a large proportion of their flowers did not set seed, the appropriate insects having failed to visit them. And of the seeds that do come to maturity only an infinitesimal percentage ever take root and grow. They are an aristocratic but decadent family, that in the struggle for supremacy, have been left far behind by the pushing Ox-eye Daisy and the parvenu Viper's Bugloss. But while we deplore the apparent lack of vitality and consequent scarcity of these always interesting and often very beautiful plants, we may perhaps find some consolation in the reflection that at any rate none of them will ever be held up to public execration in the Agricultural Department's book of "Farm Weeds."

NOTES.

THE CARDINAL (*Cardinalis cardinalis*, Licht.) AT OTTAWA.—A fine adult male cardinal was noticed by Col. Wm. P. Anderson, in his garden at 64 Cooper St., on June 22nd, and in his own and neighboring gardens for two or three days afterwards. It was in company with the common robin and was apparently a wild bird. It fed upon green rowan berries and the green seeds of the lilac. The cardinal has been collected at several places in western Ontario and two have been taken as far east as Toronto. The bird seen by Col. Anderson may have escaped from a cage, but it is not improbable that this individual came north with other birds during the spring migration as it is not rare in New York State up to lat. 40°.

J. M. MACOUN.

A FAMILY OF SHARP-SHINNED HAWKS.—During past seasons many nests of eggs of *Accipiter velox* have been located, but no sets of six have come under investigation. On August 6th, while passing through some evergreen woods, I was attracted by the cries of a Sharp-shinned Hawk. After a close scrutiny of the spruce trees the nest was located in the top of one of them and at first glance it could be seen that it was occupied, as the rim was clogged with excrement and feathers. A nearer approach revealed the tenants peering anxiously through the evergreen boughs. When about an arm's length from the nest a formid-

able battle-line of six young Sharp-shinned Hawks was encountered the whole family being perched around the edge and watching every movement of the intruder. The birds vied with one another in the attack and shuffled each other about in the endeavour, to my mind, to obtain the most prominent striking-point. One more daring and adventuresome than the rest fell over the side of the nest and hung head downwards from the projecting twigs. The others, apparently, envied this position, as they made several attempts to use the unfortunate bird as a perch. At this juncture I descended, as it was evident the family would shortly come to grief. The parent birds, strange to say, did not join in this demonstration, but kept some fifty yards away, uttering their alarm notes at intervals. The young, judging by their vigorous protests and actions, were ready to leave the nest. A week later the birds, old and young, were discovered in the tree tops in the vicinity.

W. J. BROWN, Westmount, Que.

THE WHITE-WINGED JUNCO IN MANITOBA.—On the sixth of October, my brother, Stuart, saw a strange Junco among a number of *hyemalis*, and recognising it as probably new he collected it. It answers very well to *aikeni*, having the characteristic white wing bars with the three outer tail feathers wholly, and the fourth partly white.

This makes three different Juncoes recorded for the province: *hyemalis*, an abundant species which breeds in fair numbers; *aikeni*, and *shufeldti*, both as yet only observed as migrants.

The White-winged Junco breeds in North Dakota and winters in Colorado and Kansas. It has not, so far as I am aware, been previously recorded for Canada, though odd individuals that looked like it have been seen from time to time at Aweme.

NORMAN CRIDDLE.

HOYT'S HORNED LARK IN MANITOBA.—This Horned Lark, *Otocoris alpestris hoyti*, was taken by my brother, Stuart, and individuals identified through the courtesy of the Chief of the U.S. Biological Survey, by Mr. Oberholser. Though this appears to be the first definite Manitoba record, the bird is quite abundant during the the migratory seasons and arrives in company with the Lapland Longspurs. It can be readily distinguished in the spring from the Prairie Horned Lark, by its rather darker and more distinctly marked plumage. In habits, too, it may be told by its manner of hiding behind clods of earth, like its companion the Longspur, whereas the latter always mounts them, as if desirous of being seen.

Unfortunately the geographical races of Horned Larks are so closely allied that it is almost impossible to tell one from another in nature, and it is only by studying their habits that we can hope to distinguish them.

Hoyt's Horned Lark has been recorded by me for several years past under "Desert Horned Lark," which has not yet been authentically taken in the province. Both these birds occur in Saskatchewan and Alberta, and the latter, according to Oberholser, breeds north of latitude 49°.

NORMAN CRIDDLE.

FESTUCA OCCIDENTALIS IN ONTARIO.—In an open coniferous formation on a rocky point at Oliphant, Ontario, on the Lake Huron shore of the Bruce Peninsula on June 14th, 1911, I found *Festuca occidentalis*, Hook, to be common. On June 16th, I found the same species in a *Populus-Thuja* formation near Boat Lake at the centre of the Base of the Peninsula.

As this species was not reported from further east than Keweenaw County, Michigan, its discovery on the Bruce Peninsula was an eastward extension of range and I consequently sent specimens to Prof. A. S. Hitchcock, Systematic Agrostologist of the Bureau of Plant Industry at Washington, who confirmed my identification. The occurrence of this western grass on the Peninsula is interesting in view of the fact that I have found a somewhat marked western and southern tendency in the flora of this locality, particularly on the Lake Huron shore. Here are found *Solidago riddellii*, Frank, *Cacalia tuberosa*, Nutt., *Linum medium*, Britton, *Saturcia glabra*, Fernald and *Gentiana procera*, Holm, all plants whose range lies mostly to the south and west of Ontario. I have already recorded (Rhodora, Vol. 10, No. 119), the occurrence on the Peninsula of another western grass *Melica smithii*, Vasey.

A. B. KLUGH, Queen's University,
Kingston.

NEW MEMBERS.

The following new members were elected at a recent meeting of the Council of the Club:

MISS F. FYLES, Ottawa.
MR. E. A. HOWES, Ottawa.
MR. D. A. MARTIN, Lawson, Sask.
MR. EDW. ARNOLD, Montreal.
MR. H. W. BEERS, Bridgeport, Conn., U.S.
MR. J. W. EASTHAM, Ottawa.

THE OTTAWA FIELD-NATURALISTS' CLUB.

LECTURE PROGRAMME

November 14th, 1911, (Tuesday), (under joint auspices of the Ottawa Horticultural Society and the Ottawa Field-Naturalists' Club).
"Landscape Gardening" (Illustrated).
Prof. F. A. Waugh, Amherst, Mass.
(Normal School Assembly Hall).

November 28th, 1911, (Tuesday)—
"The Big Game of the Ottawa Valley" (Illustrated).
Prof. E. E. Prince, Dominion Commissioner of Fisheries, Ottawa.
(Normal School Assembly Hall).

December 12th, 1911, (Tuesday)—
"Some Insect Friends and Foes" (Illustrated).
The President, Mr. Alex. McNeill, Chief of Fruit Division, Ottawa.
(Normal School Assembly Hall).

January 9th, 1912, (Tuesday)—
"Water and Health."
Prof. F. T. Shutt, M.A., Chemist, Central Experimental Farm, Ottawa.
(Normal School Assembly Hall).

January 23rd, 1912, (Tuesday)—
"Habits of Some Turtles and Batrachians" (Illustrated with specimens).
E. A. LeSeur, Esq., Ottawa.
(Carnegie Library).

February 13th, 1912, (Tuesday)—
"Variation in Plant Life, its biological significance and practical value"
(Illustrated with specimens).
M. Oscar Malte, Ph.D., Ottawa.
(Carnegie Library).

February 27th, 1912, (Tuesday)—
"The Evolution of the Worlds" (Illustrated).
J. S. Plaskett, B.A., F.R.S.C., Dominion Observatory, Ottawa.
(Normal School Assembly Hall).

March 8th, 1912, (Friday)—
(Under joint auspices of the Ottawa Normal School and the Ottawa Field-Naturalists' Club).
"Our Native Birds" (Illustrated).
Mr. Charles W. Nash, Biologist, Provincial Museum, Toronto.
(Normal School Assembly Hall).

March 19th, 1912—ANNUAL MEETING.
Election of Officers, Annual Reports, Etc. (A full attendance of members is requested).
(Carnegie Library).

THE OTTAWA NATURALIST

VOL. XXV. OTTAWA, DECEMBER, 1911 No. 9

POPULAR AND PRACTICAL ORNITHOLOGY.

(1).—The Snowflake.

By Norman Criddle.

Snowflakes are birds of the Northern Hemisphere, breeding in the far north from Newfoundland, Greenland and Hudson's Bay, west to Alaska, and north to about lat. 63°. They winter throughout the Canadian Provinces south to the middle United States.

As we know it, the Snowflake is a whitish bird with partly black wings and tail, and its back washed with brown. In its summer dress it is entirely black and white. Its home, as I have stated, is in the far north where the feet of white men seldom tread. Here among the mosses, or hidden by some over-hanging rock or boulder, it builds its nest and rears its young. Here too, it sings its song of love—a song that we in the south seldom or never learn to know. This song has been described by some as sweet and pleasing, by others as mere twittering or a short whistle. Personally, I have never had an opportunity of meeting the bird in its breeding grounds, but to judge from a captive that had lost the power of flight, its song is both loud and pleasing, being somewhat of the jovial type that distinguishes the Fox Sparrow, in fact there is just a faint resemblance between the two. I can bring it to mind by the following syllables: *When will-you meet me, when will-you meet me.* This is uttered in a clear, loud voice, and when once heard cannot be confused, so far as I know, with any other song. The song too is often followed by a number of very shrill notes resembling the first few in the air song of an Oven bird, which would lead one to suspect that our bird is a competitor to be reckoned with for a place among the songsters of the air.

To most of us, however, the Snowflake is a winter bird, not a summer one. We are apt to herald its return from the north as a harbinger of winter and to associate its presence, in numbers, as an indication of rough weather, or perchance a blizzard. As

a rule it is a bird of the plains and probably reaches its greatest abundance in Manitoba and Saskatchewan. In these provinces it flocks over the prairies in search of food, gathering in all manner of seeds from plants protruding above the snow. On the approach of storms the prairies are abandoned for more sheltered situations and it is then that we have the visitations around the farm buildings; at times in such numbers as to almost rival the fast falling snowflakes from which the birds take their name. At such times they gather about the farm-yard and subsist upon the seeds of weeds sticking up above the snow or pick up such as are brought to view by the fury of the wind, and, as the weather clears once more they return to their usual haunts upon the open country. In Manitoba they reach us from the north, during the middle of October and leave again in late April, a few remaining well into May.

In this age of practical knowledge something more is required, however, than mere statements. We are asked to look upon the economic side of things, be they what they may, and therefore if we wish to picture, however lightly, a bird's life we must not forget its value in dollars and cents. A casual observer would probably describe a Snowflake as a bird of small value economically, which fed chiefly upon the wild seeds found about the prairies. There are other opinions, however, and some individuals actually go so far as to advocate a general war of extermination on the grounds of injury to grain, both in the stack and when it is sprouting in the fields during spring time. We will, therefore, endeavour to present the evidence.

To begin with, Snowflakes reach us as I have already related, about the middle of October. They then congregate largely upon ploughed fields or cultivated land. What fall wheat there is growing is already too far advanced to be damaged, and as there is no other crop, so far as I am aware, to be injured, the birds must occupy themselves at this time in picking up either useless material, such as spilt grain or weed seeds, and as there is no grain on summerfallow, land much frequented by snow birds, and as weed seeds are nearly always present, we must conclude that it is these which are being eaten. In winter time as the snow becomes deep the birds desert the ploughed fields and gather more upon stubble land and prairies. It is at this time that they have been accused of collecting around grain stacks and destroying them. But, here again the evidence appears much exaggerated. Supposing the birds do gather upon stacks, and this is not a common habit, the most they could do would be to destroy the top sheaves, amounting in all to not more than half a dozen on each stack. Not a very great loss, even supposing them to be fit for feed, which, as a matter of fact,

they seldom are on account of continued exposure to weather. It must be admitted, however, that when large areas are left unthrashed for several months, as is occasionally the case, and left too in the stack that there is a chance for more than slight damage, though even then I doubt its being very extensive, and it must be incomparably less than is the loss by exposure to climatic conditions.

Now, let us view the other side of the question. In winter time the covering of snow prohibits more than casual ground feeding, therefore, it is those plants standing above the snow that afford or offer food in the form of seeds. What are the plants that are most commonly met with at such times? Answer: lamb's-quarters, redroot, Russian pigweed, docks, ragweeds, false ragweeds, wormwoods and foxtails, besides many more; weeds which take a heavy annual toll from the farmer. In addition to these the seeds of many grasses and wild plants are eaten, all of which are of small importance economically.

In spring time, before they leave us, Snowflakes have been accused of eating sprouted grain, as well as that recently sown. The former charge has undoubtedly some foundation in fact, though the evidence does not warrant a condemnation on that account, particularly as the sprouts are usually broken off, enabling the lower portion to grow again. As for the birds eating sown grain, that is an impossibility, when it is sown correctly with modern machinery. On the other hand it cannot be doubted that the birds pick up many weed seeds while on the fields in spring time, and so once again more than balancing any injury done.

Such is a summary of the evidence as it appears to me from field observations, and this has been amply borne out by the examination of stomachs elsewhere.

During the winter of 1910-11 my brother Talbot captured a male Snowflake with a damaged wing and gave it to his sister Alma. It was wild at first but soon learnt to recognize its mistress, and in time the other members of the household, so that it would allow not only a close approach, but welcome them with raised crest and a cheerful cry oft repeated, sometimes followed by a call note when left alone. In July the bird commenced to sing, softly at first as if afraid of being heard, but later with a loud clear voice often uttered in our presence as if he were proud of it. He continued to sing on cheerfully for about a month and then stopped.

As might be expected, such an opportunity of learning something of the food habits of the species was taken advantage of, and so our "Snowie," as he was called, was fed, or rather, given all manner of things to test his tastes. He was fed as a

rule and flourished upon weed seeds, consisting chiefly of wild buckwheat, green foxtail and lamb's-quarters, but was also given many other seeds, including wheat, oats, barley and rye. Among the weeds a decided preference was shown for foxtails (*Setaria* sp.) When all were present at once, including the grains, several of the different kinds would be eaten in rotation, though a slight preference seemed to be shown for wheat. All were readily pulled from the heads when offered in that form, and with oats the husk was removed and the kernel alone devoured. Barley and rye proved far less palatable and were, as a rule, discarded, but several grasses and seeds of other wild plants such as *Aster*, *Solidago*, *Taraxacum* and *Liatris* were readily consumed. This bird would also occasionally pull a few sprouts from a pot of newly growing wheat, breaking them off near the ground, but as the plants got stronger they were ignored.

Among all the food eaten, however, none was so much relished as insects. The greatest luxury probably being mealworms, though flies were also eagerly looked for and expected when any one entered the room. Spiders, bugs and beetles also occupied a place in its diet, the latter, however, in small numbers only, and potato beetles not at all. Grasshoppers were taken readily, so were cutworms, indeed the latter proved quite an attractive dish, even the moths being partaken of after the wings had been bitten off with its beak.

This little bird still continues to live, to all appearances, happily and contentedly. He does not like strangers but calls out at one on the approach of his own people, puffing out his feathers and twisting continuously as they draw near, with, as he hopes, a choice example of his favourite food, a nice stout fly or juicy mealworm. Like all wild birds in captivity, however, he retains his winter plumage, the only outward indication that he is not truly free.

Addendum.—I had already completed this little history when I received word from home that poor little "Snowie" was no more. He had shown signs of sickness a few days previously, then seemed to have recovered, but on being visited one morning was found dead. Thus the moral comes back to us, that no matter what our intentions may be—no matter how kind we are—a wild bird enclosed within a cage is but a captive, and though it may be happy for some time, lack of exercise and insufficient knowledge of food habits are sure to tell at last, just as they would with us. Birds were made to be free, to roam the woods or prairies as their instincts indicated, and the only excuse for taking them in, is, as was the case with poor "Snowie," when they are unable to take care of themselves.

ABUNDANCE OF THE COTTON MOTH IN ONTARIO.

BY ARTHUR GIBSON.

In the Province of Ontario there occurs periodically, in autumn, conspicuous flights of the southern Cotton Moth, *Aletia argillacea*. During September, 1911, an extraordinary flight of these moths was observed in Western Ontario. Mr. W. A. Dent, of Sarnia, Ont., reports that on the evening of September 15th "these moths arrived at Sarnia in countless numbers, for underneath the electric lights in various parts of the town, the ground was covered several inches deep, and for a space of several yards in diameter with their bodies." At St. Thomas, Ont., immense swarms of the moths were also present and attracted a good deal of attention. Mr. S. J. English reported that on September 30th "they were in heaps all along the principal street—Talbot Street—and in other parts of the city." Similar flights were also observed in the United States. In *Science*, Oct. 13th, 1911, Dr. H. T. Fernald reports that the moths were rather abundant, during the last week in September, at Amherst, Mass., and Dr. Henry Skinner, in *Entomological News*, Nov., 1911, states that "from September 23rd to 26th, Philadelphia experienced a large flight of the Cotton Moth, *Aletia argillacea*. They swarmed in some parts of the city and hundreds were resting head down on the electric light poles and on plate glass windows of stores. There were many thousands of them and nearly all that I saw were in perfect condition as though just from the chrysalis. These moths are known to migrate in numbers, but it is quite strange if the great numbers seen here came from the cotton districts in the south. The moths in some places appeared to create considerable alarm, people thinking they would cause damage to plant life here."

The occurrence of this moth in noticeable numbers in Canada is by no means rare, but its appearance during the past autumn in such excessive numbers, as observed in widespread districts, is indeed remarkable. In September last the moths were present in the Ottawa district, but were not abundant. In other years they have, however, been very common in this latter locality. In 1887, Dr. C. J. S. Bethune records * the moths as having occurred in large numbers at Port Hope, Ont., on October 7th to 10th. During the same year they were abundant at Ottawa, when on October 10th, Mr. W. H. Harrington saw at least 250 or 300 upon the front of the Bank of Ottawa building, opposite Parliament Square. During the same year immense

*Eighteenth Annual Report, Entomological Society of Ontario.

swarms appeared at Hamilton on October 7th. In the year 1903, on October 5th and 8th, the late Dr. Fletcher and the writer when "sugaring" for noctuid moths, at the Central Experimental Farm, collected many specimens of this moth which had been attracted to the trees upon which the "bait" had been applied.

The fact that these moths migrate to Ontario in autumn from the Southern States is most interesting. The remarkable thing too, is that large numbers of the specimens are in such perfect condition, that one wonders how the moths make such long flights without in some way damaging themselves. Their wings, however, are very closely-scaled, so can withstand considerable knocking about.

THE COTTON MOTH, (AFTER RILEY).

The figure herewith shows the Cotton Moth, with the wings spread, and also illustrates its habit of resting with its head downward. In colour it is brownish-yellow with a purplish sheen. On the front wings are indistinct wavy transverse lines and near the centre of each a conspicuous dark spot, paler in the middle.

The caterpillars of this moth have caused enormous losses in the cotton fields of the south. Before the year 1873, annual losses from the ravages of the Cotton Worm amounted to millions of dollars, in fact in certain years of general prevalence of the worm, the loss totalled as high as $30,000,000. Since the above year, however, the insect has been kept largely under control by a change in cultural methods and the use of Paris green and other arsenical poisons. The caterpillars are, therefore, not now, nor have they been for some years, a serious factor in cotton growing.

THE NATURE OF PARASITIC FUNGI AND THEIR INFLUENCE UPON THE HOST PLANT.

By H. T. Gussow, Dominion Botanist, Ottawa.

By far the largest number of fungi causing plant diseases are of microscopic character, hence I will confine my remarks exclusively to this large enough group. The average fruit grower's and the average farmer's acquaintance with microscopic fungi,

is, I believe I am correct in stating, one of practical knowledge rather than of scientific conception. This knowledge again is mainly based on personal observations of such common forms as moulds, which are met with in all places and of probably some of the more prominent symptoms noticeable on vegetation, resulting from the attacks of parasitic fungi, than by the actual study of these forms. Of these latter the rust and smut fungi, no doubt, are the best known forms.

Many of the microscopic forms of fungi which we may find on dead plants and parts of plants, have appeared considerably like moulds on clothing, wallpaper, bread, etc.—i.e., they have not been responsible for the death of the plant. These fungi have been designated as saprophytes and are by their mode of life distinguished from parasitic fungi which are capable not only of attacking living plant tissues, but also of maintaining themselves from the food manufactured by the attacked plant for its own use, which partnership frequently results in serious injury or death of the host plant.

Microscopic fungi as the name indicates are extremely minute organisms whose study necessitates a more or less powerful microscope. Indeed, we will find that notwithstanding the minuteness of these objects, some are of a decidedly complicated structure. The use of a microscope will readily reveal a vegetative and a generative portion in each of these individuals.

The vegetative part of fungi is analogous in a certain degree to the roots, stem, branches and leaves of higher organized plants inasmuch at any rate as the vegetative parts of a fungus are responsible for the taking up of food required for its own use. The vegetative portions of fungi consist of very fine, branched, more or less long, transparent or coloured tubes, which may be likened to a human hair or fine capillary glass tubes. These tubes are technically known as vegetative hyphae. They are exceedingly small, measuring often less than a two-thousandth part of an inch in breadth, while their length may vary from a twenty-fifth of an inch to large dense masses covering whole parts of plants. The contents of these tubes consist of protoplasm which is in many cases partitioned off by means of small separating walls or septa. The hyphae may develop within the tissues of plants or cover their surface; collectively they are spoken of as the mycelium.

As soon as the vegetative part of a fungus has had time to undergo a certain development or growth, the generative portion is produced. This consists of the reproductive organs or fructification which may be of very diverse construction, but which like the seeds in flowering plants, serves the purpose of reproduc-

ing its kind. Reproduction of fungi is effected by spores which when ripe leave the parent plant in various ways and which are capable of growing independently into new plants. The sexual development of fungus spores, similarly to the seeds of higher plants is accurately known in a few instances. It is generally accepted that most fungus spores are produced asexually, that is without egg and sperm cells. The simplest form of spore production is that of the conidiospores. It takes place by the rising up from the mycelium of a number of erect hyphae, all of which produce at their tips a single or a series of spores. These spore-bearing branches are known as conidiophores. Frequently these conidiophores branch and each branch segments itself into successive spores. This is the case for instance in the fungus causing the common potato disease *Phytophthora infestans*. In other fungi the production of spores does not take place by this act of segmentation, but the contents of the hyphae itself generally form into spherical spores. In this way the smut spores of grain are produced.

A very common method of spore production is that in which the spores are produced in separate tubes, small sac-like organs, technically termed asci. These are much broader than the hyphae and are generally club-shaped. Each ascus contains from two to eight spores often more, but always an even number. The spores produced in this manner are known as ascospores and the whole group endowed with this method of reproduction is known as ascomycetes. These forms of fungi are again subdivided according to the number of spores in each ascus and by the manner the asci are produced, which may be singly as in the Peach Leaf-curl fungus, or in flat or rounded discs as in peziza or in fruiting bodies similar to pycnidia , but here termed perithecia. These conditions of spore production may become still more complicated, as even one species may produce several kinds and crops of spores.

The spores of microscopic fungi differ greatly in size and form. Their colour is more generally hyaline or transparent, but they may also be brown, grey, pink, etc. Their form varies greatly; they may be oval, round, rod-shaped, or sickle-shaped, with pointed or rounded ends. They may be of single cells, or divided into two or many sections, smooth or pitted, with net-like markings or appendages. Thus they will be found to be very different objects, but their appearance is constant in each fungus. These characters, together with the manner in which they are produced are regarded as specific and generic distinctions and are largely used for the purpose of classification. When ripe the spores are shed in various ways, the conidiospores simply become detached and are carried by the air.

Spores produced in pycnidia or perithecia may either ooze out, or be expelled with force through a hole at the apex of the fruiting bodies. Others again are freed by the collapse or decay of the conceptacles in which they are produced. When ripe the spores either pass through a period of rest, as winter spores, or they immediately germinate, when they may be regarded as summer spores. Germination can only be accomplished successfully when there is sufficient moisture available. Hence we all have had the experience of seeing some fungus disease spreading rapidly during moist warm weather (Apple and Pear Scab, Potato Disease, Mildews, and others). Under favourable conditions the spores take up a large quantity of water and begin to swell, often to double their original size. The next step in germination is a rupture in a cell wall and the protruding of a germinal hypha, which is pushed into the particular substratum (leaf, twig, etc.), where it quickly begins to ramify. We have considered previously the great variation of the fungus spores. The germination of the various spores is likewise very different and frequently an important factor for distinction of species. Conidiospores most generally germinate by producing directly one or more germinal tubes which are capable of infecting plant tissues. Smut spores, however, produce first a so-called short promycelium on which secondary and even tertiary spores may be formed which on germination produce the tube causing infection. The loose smuts of barley and wheat, however, produce infection tubes directly. Similar in behaviour are the teleutospores of our rust fungi. They also produce a promycelium and secondary spores when germinating.

Still more different is the germination of the spores of the common potato fungus. Here the contents of the conidia produced by segmentation of the branches breaks up into minute microscopic bodies, which for some time may be seen rapidly swarming about. After a very short period, however, these swarm spores become stationary and their walls thicken until they finally germinate by producing the typical infection tube.

There are numerous fungi which produce both summer and winter spores. The Black Knot of plums and cherries, the Powdery Mildew of grapes, Scab of pears and apples all produce two forms of spores. The ascospores are nearly always winter spores. The teleutospores of rusts, or egg spores of the Peronosporae, which cause the downy mildews are not ascospores, though typical winter spores. The summer spores serve the purpose of a rapid propagation of the fungus, while the winter spores are responsible for carrying diseases over the winter. Very rarely may summer spores be carried through the winter alive, owing to their feeble protection and short life. The winter

spores are produced in conceptacles, which are exceedingly well protected. They adhere firmly to the substratum on which they have been produced or are imbedded therein.

Our next problem to consider is the mode of life of fungi and their influence upon the host plant.

Green plants or chlorophyll-bearing plants manufacture their food, as you know, from the carbonic acid of the air by means of the small chlorophyll grains in their leaves and by the action of sun and water. This physiological process is known as "assimilation." The first visible product of assimilation is starch. The starch again undergoes certain changes and forms carbohydrates like dextrose and sugar, which are used as food by the plants. In other words, the manufacture of food necessary for the growth of the green plants takes place in the chlorophyll-bearing portions by means of this chlorophyll substance. Fungi possess no chlorophyll. Hence, they are not able to utilize directly the carbonic acid of the air. They are compelled to search elsewhere for the carbohydrates essential for their development and accomplish this by living upon substrata from which they are able to obtain a "ready-made" supply of food. Parasitic fungi live upon plants in various ways. They may be confined to the surface entirely like the mildew fungi, when there will be produced on the mycelium peculiar sucker-like organs—so-called haustoria—by which they absorb their food from underlying cells. Other fungi, by far the greatest number, live within the tissues of the host plant. They may also produce haustoria, but more generally the absorption of food takes place directly by the action of the vegetative hyphae on the infected tissues.

Following the growth and development of parasitic fungi, a collapse of these cells, robbed of their contents, takes place and the earliest symptoms of disease appear. Often the infection is exceedingly local and the result is the production of smaller or larger spots of dead tissue. The shot hole fungi of plums, cherries and peaches, illustrate well this peculiarly confined growth. Quite recently my attention was called to the outbreak of an alarming disease among cherries in Prince Edward Island. On investigating the epidemic I found that this trouble was due to a common plum and cherry leaf spot fungus which had defoliated practically all attacked trees. Two or three years' repetition of this malady has resulted in the wholesale destruction of cherries in this Province.

Other fungi may attack, besides the leaves and fruit, the young shoots of trees and destroy last year's growth and thus much of the expected harvest. Others again, cause cankers which spread from year to year until the whole branch is ringed

and shut off from the food supply. Formations like the enlarged portions of plants, which occur in black knot, plum pocket, club root, etc., are also very common.

It now becomes necessary to briefly consider the question of the predisposition of plants towards disease. The word predisposition may not be fortunately chosen to describe the peculiar observations that may be made in the direction of resistance or susceptibility towards disease. In medicine as well as in plant pathology we often meet with typical cases of immunity in animals or plants. For some reason or other some individuals escape a disease altogether, or remain singularly resistant in recovering unhurt from an attack. Hence, modern investigators claim that the successful selecting of resistant varieties would sooner or later decide the question of treatment for disease. This expectation is undoubtedly quite reasonable, but at present we have only just begun to open our eyes and the results obtained so far have more of a scientific than a practical value. Disease resistance has been established to a certain degree in grain—considering the rust problem, but unfortunately the varieties fairly rust-proof showed other undesirable characters, or they were disease-proof only in a small locality. We must also bear in mind that the adaptation of disease-causing organisms to new conditions will play a very important role, and at present while there is every hope of improving our knowledge in this respect, our results are not established long enough to speak the last word in the breeding of disease-resistant varieties. It would, however, be quite erroneous to construe my remarks in a manner in which they were not intended. While pointing out the difficulties, yet there is every hope of making important discoveries along these lines.

Next, let us consider the resistance to disease. In medicine we are informed that living according to common, normal sense, avoiding foods or practices which lead to the weakening of the organism, we will not only reach but maintain a condition which we describe simply as health. Health, to my mind is nothing else but the keeping of body and mind sound by performing the normal functions of our organs. Thus, by following closely our needs and by living correctly we can bring our bodies into a state of great resistance and even immunity, though we may be living amidst a serious epidemic at the moment. Infectious germs, though surrounding us constantly, will have no chance of exercising their serious effect upon us if we are in a perfectly sound state of body. It is quite impossible to avoid contact with disease germs and this being the case, prevention of disease is largely dependent upon success in bringing our organism into a strong condition of resistance. This, of course,

is exactly the same in plants. Plants are living beings subject to all kinds of ills without being actually diseased, i.e., being attacked by a specific organism bringing about a pathological condition. Prof. Marshall Ward of Cambridge, England, has expressed himself very instructively on the subject of predisposition to disease in plants. He refers to two plants of the same kind as much alike as possible in every respect, size, condition, development, etc., and goes on to say, "Picture to yourself one of these plants growing under the most perfect conditions, supplied with the proper amount of food, its roots expanding into a well-ventilated soil, rich in humus and plant food, etc., and the other growing under absolutely reverse conditions." The result will be in one case a strong healthy plant and in the other, a poor weakened plant just strong enough to keep alive. Now the conditions, not to say constitutions of these two plants must be very different. Different modes of nutrition we know produce different chemical changes within a living plant. And, no doubt, this difference in the condition of the host plant is accountable for its power of resistance or state of susceptibility. There may be a number of other factors producing similar differences in constitution or in composition, if this is more correct. A potato tuber sound and fresh, will remain free from fungi if kept in an ordinary room, while one that has been exposed to frost or steam heat for a moment will soon be covered with mould fungi of various kinds. We know of course that we have changed the chemical composition of the potato exposed to frost or heat, but we have also partly destroyed its life. The same may be said of Prof. Ward's "ill-treated" plants. Together with the changes of the chemical composition, we have reduced its vital power; hence, would it not be reasonable to expect an increased resistance to disease if the vital power of any living organism is kept up to the highest mark? That this contention is fundamentally correct is amply proven by the fact that cultivated plants which we grow under conditions to which they are not fully accustomed are, generally speaking, more subject to disease, likewise as Europeans are much more liable to disease in tropical climates and vice versa. Sudden or even gradual changes frequently result in lowering the vitality of a living organism. Cultivated trees are constantly subject to such unnatural changes.

I have endeavoured to explain briefly, in the foregoing remarks, the life and nature of parasitic fungi. We have considered how fungous diseases are spread by means of the spores produced by the causal organism, we know how different may be their modes of fructification and that winter and summer spores must be looked for in many kinds, and we have further

discussed the effect of a fungus on the host plant and hinted at certain factors rendering plants more or less susceptible to disease.

From the practical standpoint of the control of disease in our crops a knowledge of these different aspects of the subject is necessary in order that the organism causing the disease may be attacked where it is most vulnerable. We see that in spite of certain general principles the methods to be adopted against different diseases will vary with the life-history of the causal organism and hence has arisen the necessity for close investigation of these life-histories and the finding of methods of treatment based upon them which together form so large a portion of the work of the Plant Pathologist.

THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Forty-eighth Annual Meeting of the Entomological Society of Ontario was held at the Ontario Agricultural College, Guelph, on November 23rd and 24th. The reports of Directors Gibson, Grant, Cosens and Treherne on the destructive insects of the year in their respective districts showed that many of the well known pests had been present in large numbers and that consequently much damage to various kinds of crops had resulted from their attacks. Such insect pests as the Codling Moth, Apple Maggot, San Jose Scale, Plum Curculio, Oyster Shell Scale, Cutworms, Root Maggots, etc., were reported upon by the above Directors, and by Dr. C. Gordon Hewitt and Mr. L. Caesar, of the O.A.C., during the afternoon of the first day's session. An interesting account of "The Work of the Division of Entomology" of Ottawa was given by Dr. Hewitt, in which statements were made of the several branches of the work which is now carried on under his direction. During the same afternoon a paper by Rev. Dr. T. W. Fyles, of Hull, Que., on "Notes of the Season of 1911" was presented, in which observations were recorded which had been made by this veteran entomologist during the past summer.

At the evening meeting, held in Massey Hall, a happy address of welcome was presented to the members by President Creelman. Dr. William Riley, of Cornell University, who was to have delivered the Popular Lecture, unfortunately was too ill to be present, but his place was taken by Dr. Hewitt, who gave a most interesting address on "Insect Scourges of Mankind." The two dreaded diseases which are rampant in sections of Africa, viz.: Nagana, which is destructive to domestic cattle and horses, and the Sleeping Sickness, which depopulates many districts, both

of which are spread by tsetse flies, was fully discussed by the lecturer. The question of the spread of malaria and yellow fever through the agency of mosquitoes was also gone into and facts given of the early work in demonstrating that both of these very fatal diseases can only be spread by micro-organisms developed within the body of certain species of *Anopheles* in the case of malaria, and of the *Stegomyia* mosquito in the case of yellow fever. Slides illustrating various points in the lecture were shown on the screen; those illustrating the African diseases above mentioned, indicated only too well what terrible scourges these are.

In the morning of the second day's session, Dr. E. M. Walker, of Toronto University, presented his presidential address. This dealt largely with the present status of entomology in Canada and offered many suggestions as to certain studies in some of the lesser known orders of insects, which have been largely neglected by students, and concerning which much information is desired. During the afternoon of the same day the following papers were read:—

"Some Forest Insects from DeGrassi Point, Lake Simcoe."—Dr. E. M. Walker.
"Thrips Affecting Cereals."—Dr. C. Gordon Hewitt.
"The Stream."—Rev. Dr. Fyles.
"Blister Beetles."—Mr. Arthur Gibson.
"A Parasite of Hepialus thule."—Mr. A. F. Winn.
"Common Scolytids of Eastern Canada."—Mr. J. M. Swaine.
"Insect Migrations in Manitoba."—Mr. Norman Criddle.
"Catalogue of Canadian Insects."—Dr. C. Gordon Hewitt.
"Entomological Record for 1911."—Mr. Arthur Gibson.
"Notes on Hepialus hyperboreus."—Mr. A. F. Winn.
"The Bot-flies of Ontario."—Prof. T. D. Jarvis.

All of the above papers, reports, etc., will be published in full in the annual report of the Society which will appear early in the new year.

It was decided that the next annual meeting be held in the City of Ottawa during the autumn of 1912, the exact date to be decided upon later.

LECTURE ON LANDSCAPE GARDENING.

On November 14th, Prof. F. A. Waugh, Head of the Division of Horticulture and Professor of Landscape Gardening at the Massachusetts Agricultural College, Amherst, Mass., addressed a

joint meeting of the Ottawa Field-Naturalists' Club and the Ottawa Horticultural Society in the Assembly Hall of the Normal School. His subject was "Landscape Gardening," and by means of a fine set of lantern slides he showed the large audience which had gathered to hear him the proper relationship between architecture and landscape gardening, and in a very lucid explanation of the principles of landscape art, as expressed by the pictures which illustrated his lecture, he was able to impress his hearers with the importance of his subject.

Civic art, was first taken up as a branch of landscape architecture. It was shown that the same principles apply in civic art as apply in good landscape gardening. The main requirement is that the work should be done in a systematic and orderly way, instead of an unsystematic and disorderly way, and that the aim is to achieve the maximum of beauty combined with a maximum of utility. Neither can civic art ignore beauty. These two elements are not antagonistic in any case, but cooperate with one another.

Ottawa, as the capital city of a great nation, deserves special development along the lines now laid out by civic art. It has an unusually fine location, on the banks of rivers and on ground of varied topography. It would naturally profit by the experience of the other great capital cities of the world, such as Berlin, Washington, Vienna, Paris, London. A number of lantern slides were shown to illustrate the possibilities of beautiful civic development, as shown in the cities mentioned. Adequate space should be reserved for public buildings and streets and open places so arranged as to give ample effect to the large public buildings which will be required in Ottawa. Another point in the development of this city must be the preservation and beautification of the river fronts. Of these, Ottawa has several miles and has already begun, in a commendable manner, to preserve and improve them. Such preservation should be extended and the methods of improvement should be brought up to date. Aside from this, the city should reserve ample park areas, which should be selected with respect to the preservation of types of native scenery in the immediate neighborhood. At the present time, the park areas in Ottawa are distinctly inadequate. Any forecast of the future makes it certain that much larger areas should be secured at no distant date. These should be secured at once, both because the selection is easier now and because the cost of land is much less.

Landscape gardening as applied to domestic life was then discussed and illustrated by various lantern slides showing types of gardening in continental Europe, England, Japan, the United States and Canada.

With regard to landscape art in general, the speaker advanced the theory that the strictly characteristic thing on the continent of North America was a high regard for large aspects of natural scenery. Lantern slides were exhibited showing the beauties of native scenery, special attention being given to the magnificent views in the Canadian Rockies. Canadians and Americans dearly love this wild scenery, and its preservation in large public parks is a great national duty. The speaker said that while landscape gardening in many of the older countries of Europe had often meant gardening with the landscape left out, it might well mean on the continent of North America landscape with the gardening left out. While this should not be interpreted to cover the whole of landscape art, it should always be recognized as one of the most important manifestations of it in Canada and the United States.

BOOK NOTICES.

THE HOME-LIFE OF THE OSPREY, photographed and described by Clinton G. Abbott, B.A., Associate of the American Ornithologists' Union, with thirty-two mounted plates. London: Witherby & Co., 326 High Holborn, W. C. Published price 6/- net.

This delightful story of the home-life of the Osprey is a companion volume to "The Home-life of a Golden Eagle", which was noticed in the July number of the OTTAWA NATURALIST. It is the third volume of the "Bird-lover's Home-life Series" which are being published by the above firm. The author's observations were mostly made on Gardiner's Island, which is a well known breeding ground for Ospreys, and which lies about three miles from the eastern point of Long Island. The photographs which accompany the volume are particulary good and well arranged. The whole work is very pleasing and it will undoubtedly have a ready sale among students and lovers of birds.

THE LIFE OF THE COMMON GULL, TOLD IN PHOTOGRAPHS, by C. Rubow. 1/6 net, is another bird booklet recently published by Witherby & Co. This contains 25 half-tone reproductions from photographs, illustrating the nesting habits, etc. of *Larus canus*, which is one of the most frequent gulls on the coast of the North Sea and the Baltic, and which has also been occasionally met with on the Labrador Coast.

A. G.

THE OTTAWA NATURALIST

VOL. XXV. OTTAWA, JANUARY, 1912 No. 10

POPULAR ENTOMOLOGY.

The Engraver Beetles (Family Ipidæ).

By J. M. Swaine, Assistant Entomologist, Division of Entomology C.E.F., Ottawa.

Beetles of the Family Ipidæ have been described from almost every portion of this continent from Mexico to Alaska, and will probably be found wherever their food-plants occur. Many species are described from the West Indies, and a very large number from Central and South America, and from Europe. Many are known from Japan, Australia, Ceylon, South Africa and elsewhere. A few species seem almost world-wide in distribution; others are known only from small regions. A number of species, e.g., *Eccoptogaster rugulosus* and *Xyleborus dispar*, have been introduced into America from Europe.

The North American members of the family Ipidæ are usually somewhat elongate and cylindric in form, and brown or black in colour. They vary from one to a little over eight millimeters in length. *Crypturgus pusillus* is one of the smallest species, and *Dendroctonus valens* probably the largest. The legs are rather small and weak, as becomes their habits. The antennæ are short and geniculate, with an extremely large club, which is usually annulated. The vast majority of the Ipidæ cut their breeding tunnels in the bark or wood of trees or shrubs. The chief North American exceptions are referred to below.

Their burrows are of great interest, and often of remarkable regularity and beauty. Those of many species are so characteritsic that it is often easy to determine which species has been at work from an examination of the tunnels and galleries alone.

A large portion of our North American species infest coniferous trees, the pines and spruces being especially subject to attack. Of deciduous trees, the oak, beech and hickory suffer severely, and there is scarcely a northern tree but serves as food-plant for one or more species of this family. As a rule

each species has a limited number of food plants, but some, like *Pteleobius mali*, feed in many trees, both coniferous and deciduous.

According to their habits, the North American species of Ipidæ may be separated into four fairly well-marked groups: the Bark-beetles, the Timber- or Ambrosia-beetles, the Twig-beetles, and a fourth group containing a few species of varying habit.

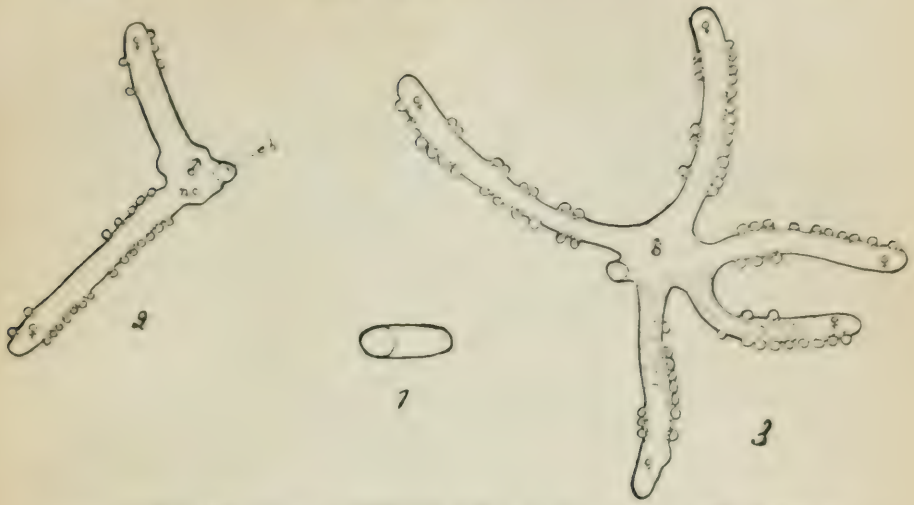
THE BARK-BEETLES.—The first of the above-named groups includes those forms which burrow in the bark, or between the bark and the wood. The adults enter through a hole in the bark, cut in many cases by the male, and drive a primary-tunnel between the bark and wood, usually partly in the bark and partly in the wood, and frequently either parallel with or at right angles to the wood-fibres. A few species burrow entirely in the bark, and others, included here in the Bark-beetles, cut their tunnels just below and parallel to the wood surface. The length of the tunnel varies in the different species from less than an inch to more than a foot. The female does the greater part of the work, while the male guards the opening and removes the chips and refuse. These main-tunnels are usually kept strictly clean. In sweeping the tunnels the beetles move backwards, scraping the refuse with the mandibles back to the fore legs, which pass it on to the middle, and these to the hind pair. When the opening of the tunnel is reached the tip of the abdomen is protruded and the refuse passed up to the hind pair of legs in the manner just indicated, and by the hind legs pushed away from the opening. In cutting the tunnels the beetles constantly revolve, and thus obtain such perfectly cylindrical burrows.

When not at work the male beetle is usually guarding the entrance. By backing into the entrance-hole the declivity of the elytra plugs the opening, and thus presents a complete protection from many enemies.

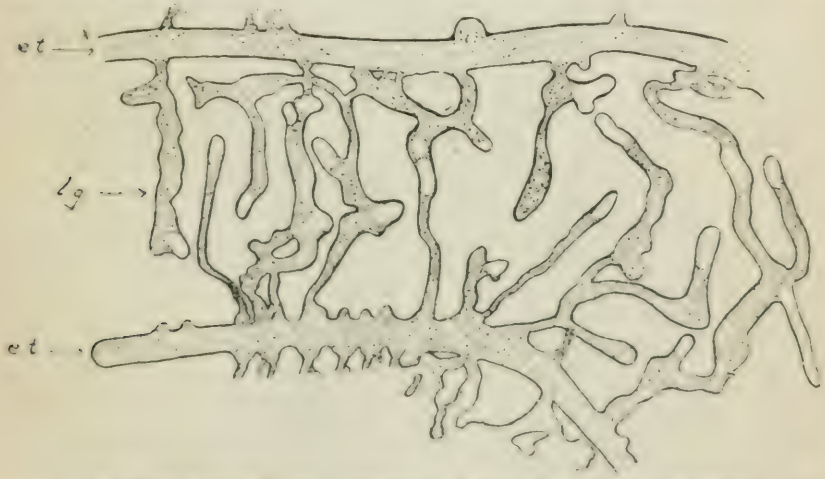
In niches along the sides of the primary-tunnel the whitish, almost transparent eggs are laid, usually one, though sometimes several, in each niche. In some species, *Ips calatus* and *Dendroctonus simplex*, several eggs are deposited in large niches; while others, *Hylurgops pinifex* and *Dryocoetes autographus*, arrange the eggs in rows along the sides of the tunnel.

When egg-laying is completed the adults of some species die, and their remains may frequently be found long after in the tunnel. Some species, however, cut a new tunnel and rear a second brood.

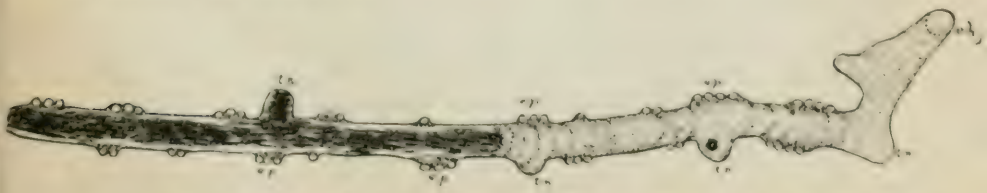
In those species which lay the eggs in masses along the sides of the primary-tunnel, the larvæ burrow in congress through the



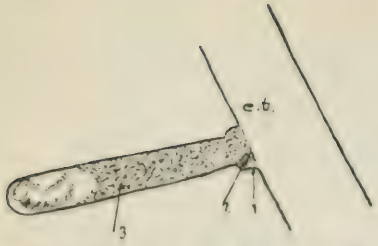
Tunnels of POLYGRAPHUS RUFIPENNIS Kirby, in spruce bark. Three stages in the development of the egg-tunnels.



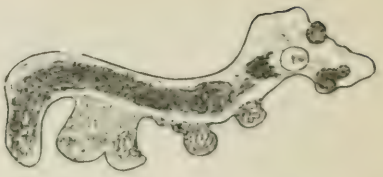
DENDROCTONUS SIMPLEX Lec. Development of larval galleries; larvæ half-grown: e.t., egg-tunnels; l. g., larval galleries.



DENDROCTONUS SIMPLEX Lec. An egg-tunnel showing egg-pockets; e. p., containing eggs; turning-niches, t. n., and entrance-hole e. h.



IPS BALSAMEUS Lec. Development of larval gallery: 1, egg-niche; 2, egg-packing; 3, excrement of larva; e. t., egg-tunnel.



IPS CAELATUS Eichk. Under side of bark, showing the eggs in the pockets.

bark, forming irregular cavaties extending laterally from the primary-tunnel.

When the eggs are laid in niches the larvæ burrow separately through the bark or between the bark and the wood, at right angles to the primary-tunnels; these side tunnels, larval galleries, or mines, thus formed increase in size as the larvæ grow, and are left completely filled with wood or bark fragments which have passed through the body of the larvæ. The latter feed entirely upon bark or wood.

If the direction first assumed by the larvæ is not parallel with the wood-fibres, the larval-mines are usually found to turn, tending to follow the direction of the fibres. The larvæ at and near the ends of the primary-tunnel swing around almost immediately, while those nearer the middle do so as rapidly as is possible without encroaching upon the mines of their neighbours. Usually the larvæ keep carefully to their own preserves, only crossing a neighbour's gallery when necessity compels them to do so. When the larval mines are entirely in the bark their direction has no definite relation to that of the wood fibres.

After the larval development has been passed, varying in length with the species, the ends of the larval mines are enlarged and sometimes driven down into the wood to form the pupal chamber. In some species the pupal period lasts but a week, or ten days, in others the winter is passed in this condition. After transformation is completed, the young adults cut their way out through the bark, forming the openings known as "shot-holes".

While the primary-tunnel and also the egg-niches are usually engraved in the wood, the larval-mines are often entirely in the bark, or only cut the wood at the pupal-chambers. On ash trunks, where the bark is thick, the larval-mines of *Hylesinus aculeatus* but slightly engrave the wood surface, while on small branches, where the bark is thin, the mines often cut the wood as deeply as they do the bark.

Frequently a number of primary-tunnels, cut by different females, radiate from a common "nuptial-chamber" situated just beneath the common entrance-hole. In such cases, with some species, the male cuts the entrance-hole, the nuptial-chamber and often the beginnings of three or four primary-tunnels. The male is then joined by one or more females, which finish the primary-tunnels and the egg-niches; the work of the male, after the entrance of the females, consists mainly in removing the chips and refuse and guarding the entrance-hole, as already mentioned.

When the primary-tunnel is long, as is the case, *e.g.*, with several species of *Ips* and *Dendroctonus*, there may be one or more "ventilation holes" through the bark.

Before egg-laying begins, whether for the first or second time, the beetles cut "food-tunnels," either beneath the bark of the host-tree or in the bark of twigs or trunk of other trees. Many species cut their food-tunnels as continuations of the larval galleries, and hibernate therein.

In Eastern Canada most Ipidæ hibernate as adults, though with many species larvæ and pupæ also occur beneath the bark in the winter.

(To be continued).

ACCESSIONS TO CANADIAN BOTANY—I.

BY EDWARD L. GREENE.

There is before me a small collection of plants which, although in quite too fragmentary specimens, is more than ordinarily interesting in view of the locality from which it has come, namely, a part of extreme north-western Yukon, not far below the Arctic circle, and a region not before touched by any collector. In the interior of the Alaskan peninsula there is a great empire of territory somewhat elevated, and extending far on both sides of the international boundary, which is almost unexplored botanically, and which promises many revelations to the student of plant geography. Many years ago there was submitted to me a small collection from the Porcupine River region, a good part of which showed a flora distinct enough from that of the coastal districts of Alaska, and as totally unlike that of the farther interior south-eastward.

The fragments now at hand from the Canadian side of the boundary, collected in the summer of 1911, by Mr. D. D. Cairnes, have intensified the desire for a more careful investigation

of that whole domain of inland Alaska. The following plants of Mr. Cairnes appear to be new; the first, a rather remarkable generic type belonging to the family of the crucifers.

MELANIDION.

Low perennial herb, with stout suberect branches racemosely floriferous throughout and subsecund. Sepals equal, narrowly oval, persistent even under the mature fruit. Stamens, six; subequal; filaments slightly flattened; anthers oval. Petals equal, the limb cuneate-obovate, obtuse, tapering to a short claw, the color, purple. Style manifest and stout; stigma capitate. Silicle firmly coriaceous, subcompressed, suborbicular, the body strongly double-convex, but the valves meeting by flattened margins forming a thick wing-like elevation all around, and dehiscent through this wing or ridge; the whole one-celled, the partition obsolete. Seeds, 1 to 4, oval or round-obovate, not much flattened; cotyledons accumbent.

MELANIDION BOREALE. Leaves unknown, as also the root and the absolutely basal part of the plant. The branches, the rather long pedicels of the fruits, and the middle of each sepal are all whitened by a villous pubescence. The calyx is wholly of a very dark purple, yet quite herbaceous as to texture. The specimen is very mature, only a few of the corollas remaining at the summits of two of the racemose branches. Most of the silicles had shed their seeds. The valves are straw-colored, also reticulate-veiny both without and within. The type is of so strange appearance and character that I am unable to name any genus to which I should say that it is nearly allied.

The locality, as given by Mr. Cairnes, is "North of Runt Creek, Long. 141°, Lat. 66° 18′, the altitude 2,300 feet."

ANEMONE CAIRNESIANA. Leaves at time of flowering, small; barely half-inch long and not much broader, ternately cut into many oblong acutish lobes and glabrous, but the petioles loosely villous; scapes stoutish, only two or three inches high, leafless, but with a conspicuous involucre of three leaves at about the middle, each divided into about three narrowly oblong or oblong-linear segments, each somewhat callous at tip, all glabrous above, beneath clothed loosely with long, somewhat appressed silky hairs; peduncle of the solitary flower whitened with a villous woolliness at and near the summit; perianth very large for the plant, measuring 1½ to 1¾ inches across in expansion, the sepals oblong, seven or eight in number, and of a deep slightly purplish blue; filaments still more deeply purple, the anthers elliptical and blackish; styles in the flower rather prominent, pubescent; fruit unknown.

This very beautiful new anemone Mr. Cairnes obtained from two localities in the region, the first specimens are from somewhere north of the Orange Fork of the Black River, Long. 141°, Lat. 66°, 10′, the land having an altitude of some 2,000 feet. These were taken on 21 June, 1911. Other specimens, and these the best, are from between Teecat and Runt Creeks, the altitude 3,000 feet, and were gathered 26 June. This is perhaps the most beautiful of American species of the genus, and the blue color of the flowers is remarkable. I gladly dedicate the species to Mr. Cairnes. Viewed as a whole the plant bears some suggestion of *Pulsatilla*; but the perianth is rotate, and from what I see in the pistils as they exist in the flower, I am confident the fruit when known will be shown to be that of genuine *Anemone*.

POPULAR AND PRACTICAL ORNITHOLOGY.

II.—THE MARSH HAWK.

By NORMAN CRIDDLE.

The range of this hawk covers approximately the whole of North America. It breeds throughout the northern portion of the continent, wherever the geographical conditions, more particularly those relating to water and flora, are suitable. These conditions being intermittent wood and open country, preferably mixed with low land containing swamps or marshes, though these latter are not essential in the choice of a breeding site. In winter time it confines itself to the more southern half of the United States.

The Marsh Hawk is at once distinguished from all other hawks by the wide and clear cut white band at the base of its tail, a distinction that is not possessed by any other kind. It may also be easily told by its method of flight and manner of hunting. There has, however, been some difference of opinion about the colour phases of these birds. Some people with a knowledge of ornithology claim that they have seen individuals of the same coloured plumage nesting together as male and female, while the majority agree that the colour phases are merely sexual, the slaty grey bird being the male and the brown individuals females. This latter is my experience, and I have come in contact with many pairs covering a period of nearly thirty years. All have answered to that description. The young birds, however, are all of their mother's dress though somewhat brighter coloured. It is quite possible that a few individuals retain this first plumage for another season, par-

ticularly if the bird has suffered some illness or is retarded through other causes, just as a caged bird seldom acquires full summer vestiture. Apart from this it seems to me to be just as unreasonable to expect to meet with constant individuals of that class as it would be to find robins masquerading in the dress of their mates, either male or female.

In their home life, that is when they are breeding, Marsh Hawks usually select some low-lying ground though it may be many miles from water. Thus, choosing a situation usually among low bush, or at least where the trees are not very close together, they commence to build a nest chiefly of small sticks and stems of grass, the latter being used more particularly for lining. This nest is generally a bulky affair placed upon the ground. I have found them among willows close to water, also among low aspen poplars, or even tall ones, in situations by no means appropriate to the bird's name. My experience is that they prefer open prairies intermixed with bluff and marshes, though when the latter are not available they adapt themselves to the former. I have never, however, found a nest on high land away from some sort of trees. If undisturbed these birds will return to their old haunts year after year, though choosing each season a new situation on which to place their nest. It is interesting to watch them while they are seeking for a nesting site. They seem first of all to decide upon a locality, then flying to and fro looking over every inch of the ground, they gradually determine upon the actual spot. During this period of selecting and building, the male, as well as helping in the work, indulges in many antics for his mate's edification; the chief one being to turn summersaults. These acrobatic performances are most interesting. He usually starts with a sort of wobbly flight as if imitating a tipsy individual, then swooping downwards, he turns completely over, occasionally several times in succession and then darts up again with a cackle to repeat the same performance over again, often tumbling within a few feet of the female which is usually flying below. Occasionally these performances are terminated with the wobbly flight over again, at other times they neither start nor end in this manner. I have also observed the female try her skill in the same way but she lacks the confidence and grace of her husband. These birds also often utter shrill cries, more particularly when two males are present; they also sometimes fight, specially the males.

During the breeding season the hen seems to keep very continuously on the nest while her lord replenishes the larder. At such times he may be seen flying low around bush and field in search of gophers or mice, though a small bird, too, does not come amiss. If you were in the vicinity of the nest you would

see him return many times, but seldom without a rodent in his claws. The eggs are pure white and rather rough in texture on the surface. I have found them to vary in numbers from four to seven. The young, as with all our birds of prey, hatch in rotation, as the eggs are laid, so that they are of different ages. They are odd little fellows at first, all fluff, with large heads, but they very soon learn how to claw and hiss.

Several theories have been advanced as reasons for the hatching of young at different times. The chief advantage, however, seems to be that of protection, especially with birds of prey. The first born soon learns, not only to protect itself, but its younger brothers and sisters also, as I have more than once witnessed; indeed they are regular little demons as they throw themselves upon their backs and use their claws vigourously. They will also readily hop to the rescue of a younger companion and are thus a means of defending the whole family against any intruder, be it skunk, badger, or coyote. The mother, too, is a fearless defender of her brood and is by no means to be trifled with; indeed her daring on some occasions would, I believe, lead to serious scratchings did one offer an opportunity. In this respect the male is far less bold and contents himself with making faint dives, taking care to keep well out of reach.

The food for the young is collected by both parents and they are careful to pluck or skin everything before offering it to be eaten; they also carry away all tell-tale bones, etc., so that there is no unnecessary odours to attract enemies. The young, too, as soon as they are able, move away from the nest, and by the time they are nearly fully fledged may be discovered several hundred feet away, and when at last they learn to fly they are often widely separated and are to be seen resting upon some fence rail or upon the bare ground. At this period the parents can be seen teaching them to catch game for themselves, the exercise consisting of dropping a ground squirrel or some other animal and enticing the young to catch it before it reaches the ground, the lesson being repeated until proficiency is attained. After this they are instructed in field work, and soon learn to hunt for themselves.

I am not, however, of that school who beleive the young only acquire proficiency through the parents teaching. It unquestionably helps, but I believe a young bird would still acquire the instinctive habits of its progenitors, supposing them to be separated, at a very early age. This seems to me particularly borne out by the habits of the young when they first learn to hunt for themselves, in making, as it were, a speciality in seeking grouse. This they unquestionably do and from August till the middle of September are one of the worst enemies our prairie

chickens have to contend against. Of course, only the young chickens are captured and they at this time are only partly fledged and, therefore, by no means strong on the wing, consequently they fall an easy prey and make an excellent meal. They are captured as they rise and before they have time to acquire speed. As they become older they naturally get stronger and the hawks learn from experience that the grouse are no longer available for food, and so devote themselves to smaller, but more easily captured prey; having once learnt the lesson they appear never to forget it, and in future like their parents adapt their tastes to rodents and small birds, though occasionally an old bird will attack and capture a partly grown grouse or even domestic fowl. To me this habit seems a remnant of bygone days, a revival of an older instinct when the birds' feet were better adapted for capturing big game. This is no isolated instance; many animals can be traced backwards through the habits of their young, which in later life they loose.

Marsh Hawks are expert hunters. They may be seen at all times of the day, but especially late in the afternoon, skimming low over the ground in search of their favorite food—gophers and mice; they also seem to know that those rodents are more often to be met with round the edges of cultivated ground, as they are often seen to follow a field right around.

As the season advances into October, gophers become scarce and the hawks in consequence, are obliged to depend more upon mice and small birds, and it is while after the latter that they show their greatest skill, beating every bush as they go along, first one way and then another. Those bushes encircling the edges of fields being particularly attended to as it is in such that small birds congregate. The patience and assiduity these hawks show at this time is remarkable to behold, and one cannot help admiring their skill, though feeling all the time for the hunted.

In Manitoba, Marsh Hawks reach us from the south towards the end of March and leave again for warmer quarters in late October and early November. They usually arrive singly, the males coming first, followed in a few days by the females.

I have already indicated the general food habits and it is therefore sufficient to add that a thorough examination of stomachs at Washington fully bears out the evidence as supplied from field observation. Marsh Hawks unquestionably do some harm, by destroying immature grouse, this is particularly so of the young; they also occasionally help themselves to young poultry, but this latter habit is seldom indulged in. On the other hand they devote by far the greater portion of the season to hunting rodents such as gophers, chipmonks and mice, all

enemies to the agriculturist; and, therefore, justly weighing the good deeds against the bad, leave, I think, much in the birds' favour and show it well worthy of protection.

THE STATUS AND DEVELOPMENT OF CANADIAN ARCHAEOLOGY.

(Abstract of a paper presented by MR. HARLAN I. SMITH, Victoria Memorial Museum, Ottawa, before the American Association for the Advancement of Science, Washington, D.C., Dec., 1911).

The archaeological work of the Geological Survey since June 15th, 1911, the date of Mr. Smith's appointment as Dominion Archaeologist, has been divided into two main groups—the activities for diffusing archaeological knowledge by such means as museum exhibits, guide books and lectures, and those for increasing such knowledge as by exploration, original research and systematization.

The national collections have been classified tentatively into groups corresponding to the five ethnological culture areas. This grouping may be modified with the progress of research. The collection from the southern coast of British Columbia and the one from the southern interior of British Columbia are representative, and the collection from Ontario is large. The other provinces of the eastern woodlands, the plains and the arctic are hardly represented at all, and in fact our knowledge of them is almost nothing. Popular guides have been prepared for the two western archaeological areas and work is progressing upon similar guides for the others. A series of lantern slides illustrating the archaeology of Ontario has been made; general and topical labels for the collections are in the hands of the printer; duplicates of these will probably be furnished to other museums throughout Canada, and with duplicate specimens, casts and photographs when supplied to these museums will make the archaeological work truly national.

An archaeological survey of the Dominion is being organized and a reconnaissance has been made of some of the village sites in Ontario.

A survey of Brantford township has been completed by Mr. W. J. Wintemberg. A system for systematizing and digesting the scattered and incomplete archaeological data at hand and to be received in the future has been established. The co-operation of railroad officials, the North West Mounted Police, Indian Agents and geological explorers has been secured.

It is proposed to explore the less well known parts of Canada beginning with intensive exploration at one site in each of the great cultural areas that the results in the way of collections and monographs may be used as standards to which to refer for identification the results of future exploration obtained in bordering areas where we may expect to find mixed or superimposed cultural material.

It is planned in the near future to make a reconnaissance of the plains from which there is practically no material to-day available, to continue scientific exploration into the northern interior of British Columbia using the Grand Trunk Pacific as a base, and to do an intensive piece of excavation along the St. Lawrence. Next, the shell-heaps of the Atlantic coast may be examined.

THE YELLOW BREASTED CHAT AND THE CAROLINA WREN IN ONTARIO.

By W. E. SAUNDERS, LONDON, ONT.

Until June, 1909, when the writer walked from Amherstburg to Blenheim in the endeavor to outline the distribution of some of the more southern birds in Ontario, the only record of the summer residence of the Chat in Ontario, outside of Point Pelee where it breeds regularly, was that in McIlwraith's book of a pair having spent the summer near Hamilton.

The undertaking of 1909 developed the fact, that the birds were to be found in single pairs at two or three places along the southern border of western Ontario, the farthest east being near Renwick, which is about five miles north of Lake Erie, and perhaps twenty miles north-east of Point Pelee.

I am now permitted to record the apparent nesting of a pair near London in the summer of 1911. The bird was first seen by Messrs. C. Watson and M. Dale, on May 22, in a wood about six miles west of London, which is a favorite haunt of the Cerulean, Mourning, Golden-wing and Chestnut-sided Warblers, and the Blue Gray Gnatcatcher, and, also, consequently of our local ornithologists. In this wood on the early morning of the 22nd of May, the above mentioned gentlemen heard the call of the Chat; fortunately they had both visited Point Pelee with the writer earlier in the month when they became acquainted with this bird for the first time, so that when the note was heard, they realized the prospect ahead of them, and therefore they stuck to the job until the bird was well seen. Since then they have visited the locality four times, the last of which was on

July 1st, and each time the bird was either seen or heard, or both, so that there can be little doubt that it is breeding there. In consequence of a trip to Alberta which occupied all of June, the writer has not yet had an opportunity of visiting the spot, but hopes yet to see the bird before the opportunity is gone. There can be little doubt that this species is spreading through the west end of Ontario, which is the case with the following species.

The Carolina Wren has a little the start of the Chat as far as Ontario is concerned, although the addition of the bird to our fauna took place at a much later date, the first specimen being taken by Mr. L. H. Smith, at Forest, Ont., in February, 1891. After that it was not reported for the Province until the present contingent of visitors began to go to Point Pelee in 1905, where it was found that the bird was quite common.

On the walk previously referred to, the Wren was found scattered through the west end of the Province in only slightly greater numbers than the Chat, but it has been reported from many more districts and three have been seen and heard right around the city of London, one of which in the spring of 1910 looked like a probable breeder, but the opportunity to prove this did not occur. A pair spent a couple of summers at St. Thomas, between April, 1905, and the winter of 1906-07, and a sufficient number of single notes have been made for various parts of the west end of Ontario to satisfy anyone that the bird nests in scattered places irregularly over the whole west end of the Province.

GOSSAMER SPIDERS.

It is curious to note how certain insects anticipated man in some of the activities and achievements on which he prides himself. The wonderful social organization of the ants, with their soldiers and slaves, their roads and tunnels, their domestic animals and fungus gardens, was doubtless in existence when our paleolithic forefathers were waging a dubious warfare with the cave bear and the sabre-toothed tiger. Wasps were macerating wood fibre into pulp and spreading it out into paper untold ages before the first whiff of sulphite fumes reached Major Hill Park, while another group—the mud-daubers—by stinging a captured spider so as to paralyze without killing him outright and thus preserve him as food for their larvae, may be said to have forestalled in a way our modern methods of cold storage. As for the bees, perhaps in the far future we may be able to

eliminate our drones as effectively as they do theirs. And man's latest triumph, the conquest of the air was long ago consummated by the spider. It is true that the little spinner's flying thread is at the mercy of the wind, and is not susceptible of direction like the aeroplane or the dirigible, but still it enables him to travel astonishing distances with ease and celerity.

In the last week of September, 1911, an immense number of "gossamer" spiders appeared in the district around Arnprior. Every fence in the town and for at least five miles out into the surrounding country was streaming with the exceedingly tenuous lines of the little weavers. The threads, which were from about 5 ft. to 20 ft. long, were so fine that they would only be seen when the sun glanced on them at a certain angle, but when the eye caught them they looked like long ghostly hairs blowing out in the wind. Examination showed that nearly all the threads were anchored by one end to the fence rail or wire, and that the spiders were running about actively, but in a somewhat aimless manner. But here and there one of the little line-weavers still had the thread attached to his spinneret, and with his head to the breeze, which was so gentle as to be scarcely perceptible, allowed the thread to float out behind him. Presently he raised himself as high as possible on his tiptoes, at the same time elevating his abdomen until he was almost standing on his head. This seemed to be done to try if the thread waving behind him in the wind was sufficiently long to float him, and if its pull was not strong enough, he apparently spun out a little more. After raising and lowering himself several times in this manner, he suddenly let go his hold on the fence and floated quickly away on the end of the line, taking a course at an angle of about 45° with the horizon, and in a few seconds was out of sight. Who can say how far he went? Darwin in "The Voyage of Beagle" records large numbers of such aeronauts sixty miles at sea off the coast of Patagonia. Those the writer observed took a course S.E. Perhaps they reached the St. Lawrence or even entered the United States.

It was formerly thought that this "ballooning" was peculiar to one species which was called the "gossamer" spider, but it is now alleged to be common to the young of many different species including several distinct families. Some spiders are said to spin out three or four divirging threads onto the breeze, but those the writer saw were contented with a single line each.

CHARLES MACNAMARA.

BOOK NOTICE.

NEW ENGLAND TREES IN WINTER, by A. F. Blakeslee and C. D. Jarvis. Storrs Agricultural Experiment Station, Storrs, Conn., Bull. No. 69, June, 1911; pp. 307–576.

This extremely useful bulletin has recently been received. Field-naturalists will especially value this publication, and as the work is limited the edition will doubtless soon be exhausted. The authors, however, are republishing the bulletin in book form. School teachers, students of botany generally, as well as those interested in forestry will gladly welcome this ready means of distinguishing trees in winter. In the order of the arrangement of the species in the text and the scientific names, Gray's New Manual of Botany (1908), has been followed. In the "Introduction" the different terms used in the bulletin, are discussed. Beginning on page 344, the various species found in New England are treated of. The even numbered pages are devoted to an account of the trees, opposite to which are beautiful half-tone reproductions of particularly good photographs, each plate illustrating the whole tree, the trunk, twigs, etc. The illustrations of the twigs and of the fruit of the deciduous trees are very nearly natural size. Each tree is discussed under the sub-headings, "Habit," "Bark," "Twigs," "Leaves," "Buds," "Fruit," "Comparisons," "Distribution," and "Wood." These descriptions of each species are all on the one page opposite to which are the illustrations as above mentioned. Pages 329 to 343 are devoted to a "Key to Genera and Species," and pages 564 to 567 to a Glossary.

The printing, illustrations and general arrangement of this publication are most excellent, and the authors and those associated with them in the preparation of the same are to be congratulated. This work is undoubtedly one of the best, if not the best, publication of its kind that we have seen. It will give untold pleasure not only to students of botany and those interested in forestry, but also to all nature lovers, who are fortunate enough to secure a copy.

A. G.

NEW MEMBERS.

At the last meeting of the Council of the club, the following gentlemen were elected members:

MR. H. GIBSON, Ottawa

MR. FORSTER, Ottawa

NOTES.

FISH CULTURE IN CANADA.—Hatching fish by artificial means to stock the waters of Canada is engaged in on a large scale by the Dominion Government. In 1909, the Dominion fish hatcheries planted no fewer than 1,024,282,000 fry in various waters throughout the country. In 1900, only 271,-996,000 fry were planted by the Government fish hatcheries, so that the plant of young fish has increased by nearly 277 per cent. in the past ten years and the number of hatcheries has increased from 12 to 37, or 208 per cent. Of the 37 hatcheries now in operation, British Columbia and Quebec have 8 each, Nova Scotia, New Brunswick and Ontario, 5 each; and Manitoba and Prince Edward Island each have 3.

The amount voted by the Dominion Parliament for fish culture purposes in 1909 was $322,300, and of this $180,345, or approximately 56 per cent. was expended. The importance of carrying on this work can not be emphasized too much in a growing country like Canada, where the increasing population is making greater and greater demands on the fish supply. (Bull. No. 8, Dec. 30, 1911, Commission of Conservation, Ottawa).

FORESTRY CONVENTION.—Arrangements are now rapidly approaching completion for the Annual Convention of the Canadian Forestry Association which will be held in the Railway Committee Room, Parliament Buildings, Ottawa, on February 7th and 8th, 1912. The gathering is under the patronage of His Royal Highness, the Governor General, and a number of distinguished men, both from Canada and the United States, have promised to attend and take part. As the subjects to be discussed are of the most practical and pressing character, it is expected that there will be a very large attendance of all persons interested in our forest resources.

Among the subjects to be discussed will be: the separation from politics of the various forest services of Canada by placing them under civil service regulations; the consideration of what constitutes a fair appropriation for the maintenance and development of forest reserves in Canada; federal versus provincial control of forest lands; and the most effective forms of legislation for the suppression of forest fires in organized and unorganized territory and along railway lines. Discussion on the last named will arise upon the presentation of the Report of the Committee on Forest Fire Laws. This Report was prepared for submission to the Quebec Convention of 1911, but owing to lack of time it could not be reached.

THE OTTAWA NATURALIST

VOL. XXV. OTTAWA, FEBRUARY, 1912 No. 11

THE *MYXOMYCETES* OR SLIME-MOULDS OF THE OTTAWA DISTRICT; A PRELIMINARY LIST.

By J. W. Eastham, Assistant Botanist, Division of Botany, C.E.F., Ottawa.

For some time past the writer has given such attention as was possible to the study of the plants known by the names of Myxomycetes, Mycetozoa, and Slime Moulds, and on coming to reside at Ottawa in the spring of last year decided to collect and study as thoroughly as the pressure of other duties would permit, the representatives of the group to be found in the locality, in the hope that after a few seasons' work a fairly good knowledge of the Myxomycetes of the local flora might be obtained and the enquiry extended into a wider field. This seemed a desirable object for two reasons. In the first place one or two preliminary collecting trips seemed to indicate that the neighbourhood would prove rich in these organisms, and secondly, there seemed a need for the study of our Canadian species. While no very exhaustive search has been made through the literature of the subject, yet, incidentally, a good many works and papers have been consulted, and so far only one reference to a paper dealing with Canadian species, either from a local or a general standpoint, has been noticed, namely a paper by Mr. C. L. Moore on the Myxomycetes of Pictou Co., N.S. (1908). Some rather interesting data are, furthermore, to be obtained from Prof. Macbride's "North American Slime Moulds", the standard work on the American forms. In this work about 220 species are described as occurring in North and Central America, and of these about 127 are recorded from New England and New York State, an area contiguous with that of Eastern Canada. In the same work, however, only about 25 species are mentioned as known to occur in Canada, and two of these are from western localities. As there seems no good reason for supposing Eastern Canada to be greatly poorer in species than the adjacent territory to the south, it might have been inferred that even a very cursory examination of the district would result in extending our knowledge of the

northern distribution of a number of forms. This surmise was abundantly confirmed by the fact that 28 species were collected last summer in the vicinity of the Experimental Farm itself, and some 40 species are recorded for the district.

It may be considered, in view of the circumstances of the case, that the publication of even a preliminary list of the species observed is, at this time, premature. This would be a reasonable objection if it were sought to emphasize the amount of information gained, rather than to draw attention to the need for much more extended work before a record approaching completeness can be prepared. The vegetative stage of the plants, consisting of a slimy mass of naked protoplasm (the *plasmodium*) is usually concealed in decaying wood, or amongst fallen leaves or other decomposing vegetable matter, and only seeks the light when about to enter upon spore formation. While the fructification is often well exposed in some elevated place, for instance, on a tree stump, it is not infrequently on the underside of a log, amongst leaves, or on small twigs on the ground, and this, taken together with the small size of the sporangia in many cases, makes it necessary to search very carefully if nothing is to be missed. Furthermore, the sporangia are often so delicate that a heavy rain-storm after they have been formed may render the identification of them almost impossible. All these circumstances make it possible to work over a small area very thoroughly at frequent intervals, and yet enter on another search in the same spot with a reasonable hope of meeting with something new. The main purpose of the writer, therefore, in publishing this article is to secure the interest and assistance of those who may have an opportunity of obtaining specimens. It is hardly expected that many persons will collect material systematically, but the knowledge that the local forms are being studied may induce those who are pursuing field-work along other lines, or who are spending a vacation in the country to collect and preserve the specimens they meet with. The country around Chelsea and Kingsmere, for instance, suggests almost inexhaustible possibilities for the collection of these organisms, and summer residents could obtain many specimens with very little trouble.

With regard to collecting it may be said that much better results are usually obtained by a thorough examination of a small area than by superficially looking over one of wider extent. Where the material is found on dead wood a note should be made as to the kind of wood if identification is still possible. In many cases it will be found, however, that the logs, stumps and branches apparently most attractive to the Myxomycete are too much decomposed to admit of any opinion as to their

nature. Owing to the very fragile character of the specimens some kind of small box, such as pill boxes or cardboard slide boxes is almost essential to ensure their safe conveyance home. Material from the same "colony" only, should be placed in one receptacle to avoid the mixing of spores which would otherwise ensue and render identification difficult. This applies most strongly to specimens which to the naked eye appear alike, as when microscopically examined these may be found to be different species. The remaining space in the box should be packed with a little tissue or other soft paper, or failing this with leaves, to prevent damage to the material by shaking. The conditions most favourable for a plentiful crop of slime-moulds are moisture and warmth. Frequent showers during warm weather furnish ideal conditions. During the Lot, dry weather towards the middle of last summer very few specimens were to be found, while in autumn they once more became abundant. The species in the subjoined list recorded from King's Mt. were all collected in October, and so late as October 28, a species not previously met with was collected, somewhat damaged, but still readily recognizable.

It was at first intended to give a somewhat more extended account of the structure and habits of the members of the group, but on account of their diversity this would necessitate a much longer article than has been thought desirable, and without numerous illustrations would probably not give much help to those unfamiliar with the plants. A series of specimens, however, illustrating all the species here mentioned and some others, has been placed in the Herbarium of the Division of Botany at the Central Experimental Farm, and will be very gladly shown to anyone sufficiently interested to pay the Division a visit. Such an examination of actual specimens will give a much better conception of these organisms than any amount of written description.

A word may be added on the economic importance of the group. As regards most of the species this is quite negligable, but a few are parasitic in higher plants and one is the cause of a very serious disease of clutivated crops. This organism is *Plasmodiophora brassicae* Wor. which attacks a large number of wild and cultivated species of cruciferous plants, its hosts being, perhaps, limited to representatives of this family. Attacked plants first show a peculiar malformation of the root, and later the affected part rots, the plant being stunted in its growth or killed. This disease has received in English the names "club-root", "clubbing", "finger-and-toe", and "anbury", and in French that of "maladie digitoire", designations for the most part denoting the abormal form of the root. It is only

too well known in most parts of the world where cruciferous crops are grown, but in this country its occurrence is only known with certainty in the Maritime Provinces, in some districts of which it is very destructive. At the same time from verbal descriptions occasionally given to members of the staff of the Ontario Agricultural College it would seem that the disease is present in Ontario, although its occurrence cannot be looked upon as established until reports are confirmed by specimens. It would be rather strange if it were unknown here, since in the adjacent State of New York it is a very serious pest, especially in the market gardening districts around the large cities.

Another organism about which enquiries are sometimes made in the belief that it is parasitic, is *Spumaria alba*. The large fruiting bodies (aethalia) of this species, often 2 inches or more in length, are frequently found attached to the leaves and stems of various living plants, and are sometimes found in strawberry plantations. While at the Agricultural College at Guelph the writer received specimens from a strawberry grower who stated that they were present in great quantity on his strawberry beds and killing the plants. No doubt he was wrong in thinking the *Spumaria* parasitic, but the aethalia are easily broken up into a powdery mass of calcareous dust and black spores, and hence objectionable amongst the ripening fruit. In France this source of trouble is sometimes so prevalent that spraying with a solution of potassium sulphide is recommended for it. With the exception of these two, however, none of the species known to occur in this country are of any commercial importance.

In the preparation of the list that follows thanks are due to Prof. Macoun, of Ottawa, and to Prof. Macbride, of Iowa University; to the former for permission to work over a collection of material in the Herbarium of the Geological Survey, and to the latter for assistance in the identification of difficult or doubtful specimens. The additional localities obtained from a study of Prof. Macoun's material are indicated by an (M).

The nomenclature adopted is for the most part that of Macbride's monograph, but in a few instances that of Torrend (*Les Myxomycetes*, 1908) has been preferred. Where the nature of the substratum is not indicated the specimens were gathered on decaying wood.

LIST OF SPECIES.

Ceratiomyxa mucida (Pers.) Schroet.—*Ceratium hydnoides* A. & S. Although an especially careful lookout was kept for this species during the past season the only specimens collected were some immature and doubtful ones from the Boom Rd.,

Chelsea. This was the more noteworthy in view of the fact that Prof. Macoun's collection includes material from a number of places in the neighbourhood. Failure to find it in a season so favourable in many ways as the last may perhaps be ascribed to the periodicity which some species seem to show in the years of their appearance. The following are the sources of Prof. Macoun's material: -Beechwood Cemetery, Rideau Park, Rockcliffe, near Hull, Carleton Place.

Fuligo ovata (Schaeff.) Macbr.—*F. septica* (L) Gmel. Though not abundant as regards number of individuals, specimens were gathered in most of the localities examined, viz., Chelsea, King's Mt., Rockcliffe, Blueberry Point, and several places near the Exp. Farm. The largest aethalium gathered measured about 4 in. by 1½, the smallest less than a fourth of an inch in length.

Physarum sinuosum (Bull). Weinm. on dead leaves and moss near Hull (M); Exp. Farm.

Physarum nefroideum Rost. King's Mt.

Craterium minutum (Leers) Fries—*C. pedunculatum* Trent. On dead Cedar twigs, Dow's Swamp (M).

Craterium leucocephalum (Pers.) Ditm. On a dead frond of *Pteris aquilina*, Exp. Farm.

Spumaria alba (Bull.) D. C.—*Mucilago spongiosa* (Leyss.) Morgan. Plasmodia of this species were met with in great quantity amongst dead leaves in Beaver Meadow, in June. A little later the aethalia were found attached to various neighbouring objects, some on twigs on the ground, some on the stems of grasses and branches of shrubs a foot or more above the level of the ground. None of the aethalia were very large, the largest measuring a little less than two inches by one inch. Aethalia were also obtained later in the season near the Exp. Farm.

Didymium squamulosum (A. & S.) Fries. On grass, dead leaves, bark, etc. Beaver Meadow and Exp. Farm. A gathering of this species made on June 9th was the first material collected in properly matured condition.

Diderma effusum (Schw.) Morgan. Gathered once near the Exp. Farm on the leaves and petioles of a living plant of *Mitella diphylla*. The fructification was chiefly on the lower surface of the leaves, the chalky reticulations of the plasmodiocarp showing a tendency to follow the projecting ribs of the leaf, and also to envelop the stiff hairs occurring on both surfaces, thus giving a peculiar lime-splashed appearance to the Mitella plant.

Diderma reticulatum (Rost.) Morg.—*Chondriderma reti-*

culatum Rost. On dead leaves, cedar twigs and living fern fronds, Exp. Farm.

Diderma spumarioides Fries. On grass stems and dead and living leaves, Beaver Meadow.

Diderma crustaceum Pk. On dead leaves and bark, Exp. Farm and Beaver Meadow.

Stemonitis maxima Schw. Boom Rd., Chelsea; Exp. Farm.

Stemonitis Smithii Macbr. Exp. Farm. This species and the preceding were gathered a number of times near the Farm, being the ones most commonly met with.

Stemonitis splendens Rost.—*S. Morgani* Pk. This handsome species was only met with once, on a tree-stump near the Exp. Farm. The mass of sporangia covered an area several inches square.

Stemonitis fenestrata Rex. Exp. Farm.

Stemonitis herbatica Pk. Exp. Farm.

Comatricha stemonitis (Scop.) Sheld.—*C. typhina* (Pers.) Rost. Exp. Farm.

Diachea leucopoda (Bull.) Rost. Carleton Place (M), West End Park (M).

Reticularia Lycoperdon Bull. Only met with once on a stump near the Exp. Farm. The aethalium was a large one measuring about 2½ in. in diameter.

Enteridium splendens Morg.—*E. roseanum* Wing. On twigs, rotting boards, and tree stumps. Met with rather frequently in various place near the Exp. Farm; also at Rockcliffe, Kin 's Mt., and Ironsides (M).

Tubifera ferruginosa (Batsch) Macbr.—*Tubulina fragiformis* (Pers.) List. Exp. Farm.

Tubifera stipitata (Berk. and Rav.) Macbr.—*Tubulina stipitata* (B. & R.) Rost. Exp. Farm; Beaver Meadow.

Cribraria sp. One or two species of this genus were collected but were too much weathered to permit of further determination.

Dictydium cancellatum (Batsch) Macbr.—*D. umbilicatum* Schrad. Exp. Farm.

Lycogala epidendrum (Buxb.) Fries. Probably the commonest myxomycete in the district, being found almost everywhere where a search was made. As might have been expected the Old Boom Rd., Chelsea, furnished a very luxuriant crop of this species but at no time during the past season when observations were made, were the aethalia so abundant as in the latter part of June, 1910. At that time one could find large areas

where every foot of the surface of the logs bore scores and even hundreds of aethalia. On account of the comparatively large size of the fruiting bodies and the various bright shades of pink and red which they pass through before attaining maturity, this is one of the species most commonly noticed by the casual observer, by whom it is generally regarded as some kind of puff-ball; a pardonable error when it is recalled that the earliest description was published under the name *Lycoperdon epidendron*.

Arcyria nutans (Bull.) Grev. Exp. Farm.

Arcyria incarnata Pers. Ottawa (M).

Arcyria punicea Pers.—*A. denudata* (L) Sheld. By far the commonest species of the genus last season, being met with in abundance almost everywhere in the neighbourhood of the Exp. Farm in the earlier part of the summer, becoming much scarcer as the season advanced. Also collected at Beaver Meadow and King's Mt.

Arcyria cinerea (Bull.) Pers. Exp. Farm.

Hemitrichia serpula (Scop.) Rost. Near Hull (M).

Hemitrichia ovata (Pers.) Macbr. A small quantity of material of this diminutive species was gathered from the Boom Rd., Chelsea. Macbride describes it as rare and records it only from the States of Maine, Mass.; N. Y., and Ohio.

Hemitrichia vesparum (Batsch) Macbr.—*Hermiarcyria rubiformis* (Pers.) Rost. Exp. Farm. This was the last species collected, material still in fairly good condition being gathered on Oct. 28th.

Hemitrichia intorta List. This was found abundantly around the Exp. Farm during the earlier part of the season and was also gathered at Beaver Meadow and King's Mt. Macbride describes it as rare and lists it only from "Fairmount Park, Philadelphia; Ohio; Iowa." It was certainly the commonest species of the genus here, last season.

Hemitrichia clavata (Pers.) Rost. Carleton Place (M); Boom Rd., Chelsea; King's Mt.

Trichia inconspicua Rost. Exp. Farm.

Trichia varia (Pers.) Rost. Ottawa (M).

Trichia scabra Rost. Ottawa (M), Moore Creek (M), King's Mt.

Trichia fallax Pers.—*T. decipiens* (Pers.) Macbr. Quite abundant in places on the Boom Road, Chelsea.

Trichia persimilis Karst. King's Mt.

THE IDENTITY OF THE BETTER KNOWN MIDGE GALLS.

BY E. P. FELT, ALBANY, N.Y.

Recent studies in this group have shown that the old generic reference to *Cecidomyia* has very little significance, since this name has been used by various authors in such a way as to apply to almost any one of 800 or possibly 1,000 species or more occurring in this country. This is certainly not a precise definition, and in view of the fact that species which have been reared and referred to genera are constantly being mentioned in literature as species of *Cecidomyia*, we believe that the following list of some of the earlier named species of gall midges, giving the correct generic reference, will be of material service in advancing stability in nomenclature. These changes, though perhaps distasteful to some, are inevitable, since the majority of American genera at least, represent distinct lines of specialization correlated in large measure with variations in food habits.

TRIBE LASIOPTERARIAE.

Midges referable to this group are usually easily recognized by the thickly scaled costa, subcosta and third vein, the last usually lying near the anterior margin of the wing and uniting therewith some distance before the apex; claws almost invariably unidentate. Many of these midges are dark brown, ornamented with silvery-white markings and live for the most part in more or less irregular, subcortical galls on the stems of both herbaceous and woody plants.

LASIOPTERA Meign.

Usually brown, white marked species with 16 to 33 sessile antennal segments; palpi quadriarticulate, the 5th vein forked. Mostly inhabitants of subcortical tissues.

Lasioptera vernoniae Beutm. Gall a floral, petiole or midrib deformity on ironweed. On the last two it is about 6 mm. long and oval.

L. vitis O.S. The gall is an irregular, frequently lobulated, succulent enlargement on the leaf stalk, portions of the leaf, particularly near the base, or even the tendrils of grape. It may be two or three inches long and is inhabited by several other species.

L. clavula Beutm. The gall is irregularly clavate, about ½ to an inch long, on the tips of *Cornus* twigs. Within there is

a median gallery inhabited by a large, orange larva. Described as *Cecidomyia*, the present generic reference provisional.

L. ephedrae Ckll. The gall is a fusiform swelling on the twigs of *Ephedra trifurca*. Length ½ inch, diameter about ¼ inch.

L. farinosa Beutm. An irregularly ridged, warty, light brown swelling on the under side of the blackberry leaf and usually along the midrib or occasionally on the lateral veins. Length about ½ inch. This is the undescribed *Cecidomyia farinosa* of Osten Sacken.

L. nodulosa Beutm. Gall an irregular, subfusiform or elongate swelling on the smaller branches of blackberry. Length about 1 inch, diameter ½ inch. Also mentioned by Osten Sacken without description, as *Cecidomyia farinosa*.

L. linderae Beutm. Gall an irregular, subcortical swelling on the twigs of spicebush, *Lindera*, from 1 to ¼ inches in length.

L. solidaginis O. S. Gall unknown. The adult is closely related to *L. dorsimaculata* Felt. Listed by Glover as *Cecidomyia*.

L. ephedricola Ckll. Gall a resinous, elongate, lateral, brown swelling on the twigs of *Ephedra trifurca*.

L. tumifica Beutm. Eccentric, irregular, subglobose or fusiform enlargement on solidago stem. Length about 1 inch.

NEOLASIOPTERA Felt.

Separated from the preceding genus by the simple fifth vein. The forms incorrectly referred to Choristoneura by the author in 1907, belong in this genus. The species, like those of *Lasioptera*, live mostly in subcortical tissues.

N. sambuci Felt. Gall an irregular, subcortical swelling on the side of the smaller elder stems. It ranges in length from 1 to 2 inches and may have a diameter of nearly 1 inch. Described as *Cecidomyia*.

N. viburnicola Beutm. The gall is an irregular, subcortical swelling on stems of *Viburnum dentatum*. Length 1 to 3 inches, approximate diameter ½ inch. Described as *Lasioptera*.

N. cornicola Beutm. Galls very irregular, subcortical swellings with a length of ½ to 1 inch. Described as *Lasioptera*.

N. ramuscula Beutm. Gall a fusiform stem or branch swelling on aster, with a length about ½ inch and a diameter of ¼ inch. Described as *Cecidomyia*; *C. strobiligemma* Steb.

ASTEROMYIA Felt.

Distinguished from the two preceding genera by the unior biarticulate palpi and comprising a number of forms earlier referred by the author to Baldratia. These species live mostly

in apparently fungous affected galls on the leaves of aster and goldenrod.

A. carbonifera Felt. Gall oval, dark brown or jet black, ¼ inch long, on the somewhat thickened leaves of *Solidago lanceolata*. This is the undescribed *Cecidomyia carbonifera* of Osten Sacken; also listed as *Lasioptera* and *Baldratia*.

A. asterifoliae Beutm. Gall about ¼ inch in diameter, an oval, yellowish white and dark margined, apparently fungous affected blister on the leaf of *Aster lateriflorus*. Described as *Lasioptera*; listed also as *Choristoneura helena* and *Baldratia fuscoanulata*.

A. agrostis O.S. A cone-shaped abortion of a stem accompanied by an approximation and dwarfing of the leaves of *Muhlenbergia*. Described as *Cecidomyia*, also as *Lasioptera muhlenbergiae* Marten.

TRIBE DASYNEURIARIAE.

A large assemblage of species easily separated from the preceding tribe by the almost uniform absence of scales on costa, and the third vein always well separated therefrom. The antennae are cylindric, never binodose in the male, while the claws are invariably toothed. Antennal segments from 12 to over 20. Palpi uni-to quadriarticulate. Many of the species live in stem or bud galls.

RHABDOPHAGA Westw.

This genus is represented by a great number of large, usually reddish brown forms with 14 or more antennal segments; the flagellate ones of the male stemmed. This group intergrades with *Dasyneura*, the more typical members being separated therefrom by the usually tapering, nearly straight third vein uniting with the costa very near to or at the wing apex. *Rhabdophaga* displays a marked preference for willow, living mostly in subcortical tissues or apical bud galls.

R. triticoides Walsh. Gall an irregular stem enlargement ½ to 1½ inches long and about ¼ inch in diameter, resembling somewhat a head of wheat. Described as *Cecidomyia*. Synonym: *C. hordeoides* Walsh.

R. nodula Walsh. Gall a nodular swelling, usually encircling the base of the smaller branches and with a diameter of about ¼ an inch. Described as *Cecidomyia*.

R. salicis Schrk. Gall an irregular swelling on basket willow. An introduced species.

R. batatas Walsh. Gall a very irregular, polythalamous enlargement on the shoots of the low swamp willow. It varies greatly in size and somewhat in shape. Described as *Cecidomyia*.

R. rhoboides Walsh. Gall a large, apical rosette on willow shoots, with the distal third of the central leaves free, while most of the basal leaves are entirely so. Described as *Cecidomyia*

R. strobiloides O.S. Gall the familiar, rather close, pine-cone-like deformity on willow, some 1 to 1½ inches in diameter and 1½ to 2 inches long. Described as *Cecidomyia.*

R. brassicoides Walsh. Gall ½ to 1 inch long. A close apical deformity on willow, composed of a series of broad, appressed bud scales. Described as *Cecidomyia.*

R. cornuta Walsh. The larvae excavate cylindric holes in the solid wood of the largest willow stems. Described as *Cecidomyia.*

DASYNEURA ROND.

Separated from the preceding by the third vein being straight or curved anteriorly, tapering but little distally and uniting with costa distinctly before the apex of the wing. Species usually dark brown. Food habits somewhat variable, the species living mostly in simple bud or leaf galls.

D. rhodophaga Coq. The larvae occur in buds of cultivated roses. Described as *Cecidomyia*, later referred to *Neocerata.*

D. trifolii Loew. The larvae live in the folded, slightly deformed leaflets of white clover, *Trifolium repens.* An introduced European species.

D. vaccinii Smith. The larvae occur in terminal buds of cranberry. Mentioned by Osten Sacken without description, as *Cecidomyia vaccinii.* The invalid *C. oxycoccana* proposed by Johnson is antedated by *C. vaccinii* Smith, not Osten Sacken.

D. gleditschiae O. S. The larvae occur in the folded leaflets of *Gleditschia.* Described as *Cecidomyia.*

D. pseudacaciae Fitch. The larvae occur in badly deformed, rolled leaflets of the black locust, *Robinia.* Described as *Cecidomyia.*

D. semenivora Beutm. Gall a deformed fruit of violet. Length about ½ inch, diameter ¼ inch, irregular, a variable brown. Described as *Cecidomyia.*

D. rhois Coq. Gall an elongate, oval swelling 5 mm. long on the small roots of poison ivy, *Rhus toxicodendron.* Described as *Cecidomyia.*

D. leguminicola Lintn. The yellowish midge larvae occur in clover heads. Described as *Cecidomyia.*

D. lysimachiae Beutm. Gall a conical, enlarged terminal bud of loosestrife, *Lysimachia.* Described as *Cecidomyia.*

D. serrulatae O. S. Gall a subconic, deformed alder bud ¼ to ½ inch in diameter. Described as *Cecidomyia.*

(To be continued.)

DRINKING WATER AND HEALTH.*

BY FRANK T. SHUTT, M.A., F.R.S.C., DOMINION CHEMIST.

Of the many natural blessings we possess, good health is easily first in importance, if for no other reason than that it enables us to enjoy life—to make the most of life—and to do our duty by ourselves, our families and the State. Good health means something more than freedom from disease and pain—it implies strength and activity, physical and mental, to do our work in the world and to do it at our best. It is indeed something to be prized and well guarded, for it is easier to maintain than to get back again once having lost it.

While still enjoying good health it is doubtful if we recognize the obligation—the religious obligation I might call it—to protect and preserve our health. To do so we must oftentimes be willing to forego temporary pleasure and enjoyment. Too many take little heed, until perhaps they come to middle life or later, of those things and conditions that contribute towards the conservation of health. Perhaps a better day is dawning. The fundamentals of hygiene are being taught in our schools and the rising generation should know something of the laws of health. Hitherto, as a people, we have had to pick up here a little and there a little, oftentimes learning by bitter experience—and perhaps too late. Forewarned is in a large measure to be forearmed. At all events those who are to take our places will not be able to urge ignorance in matters relating to food, water, fresh air and a great many other things all closely connected with the preservation of health.

But I would point out that a knowledge of these things, necessary as it is, will not in itself be sufficient, there must be the desire to profit thereby, to put it into practise. And with all there must be the exercise of common sense, nothing can take its place. We shall find if we will only cultivate this gift it will help us along very satisfactorily many a time when science is apparently silent as to which path to choose, what action to take.

Our health, as we all must know, is largely dependent upon the character and amount of the food we eat and its freedom from adulteration, the purity of the water we drink, the freshness of the air we breathe, and the character of the exercise we take or of the work we do. To-night we are to consider one of the more important of these factors—the water we use for drinking purposes.

* A condensed account of a lecture delivered before the Ottawa Field-Naturalists' Club, Ottawa, January 9th, 1912.

The water we drink may become, does in part become, part and parcel of ourselves. The metabolism always going on within us and resulting in growth, in the repair of waste, in the production of energy, requires that every tissue of the body should possess water. Thus, the blood that bathes every tissue, and constitutes about one twelfth of the body weight, is about 80 per cent. water. Of the body weight about 60 per cent. is water. The adult individual requires five to six pints of water, or its equivalent, daily. The consumption of certain foods, such as milk, which is 85 per cent. water, of fruits and vegetables which have a high water-content, lessen the volume necessary to take as a beverage.

With this knowledge of the part played by water in the animal economy and its presence everywhere throughout the system, it is not difficult to understand how polluted, foul water may affect health. We are all aware now-a-days that certain diseases, zymotic diseases as they are termed, are caused by specific bacteria or germs. It may suffice to say these pathogenic bacteria having gained an entrance into the system, through the water we drink, the food we eat or the air we breathe, may and often do cause disease within us. It is the function of the phagocytes, or white corpuscles of the blood, to combat with and destroy these germs, and in good health, when we have strong vitality, they perform their function well and keep us free from disease. But, with a lowered vitality when the host of intruders is too great and strong to battle with, they may be beaten in the warfare and we succumb. Among water-borne diseases the one we have to fear most is typhoid fever. The excretal discharges of its victims are loaded with its bacilli and when such waste finds its way into a water supply the disease is disseminated and an epidemic results. Herein lies the chief and great danger in using a supply polluted with sewage or excretal waste. It must, however, be added that water is not the only vehicle which conveys this disease; the ubiquitous house-fly, as we know, must now bear its share of the blame.

But there is another danger in impure water, though of this bacteriology takes no note. I refer to the presence of certain poisonous substances, the products of the decomposition of organic matter—either of animal or vegetable origin. There is good evidence that such polluted water may cause headache, nausea, indigestion, diarrhoea, lassitude and generally lower the vital tone of the system. It is quite true that such toxic compounds have not been isolated, but I might answer that such is the case with many ptomaines, organic compounds occasionally occurring in our foods - and especially in those

which have been stored. Such foods may be and frequently are consumed with fatal results. There is every reason to believe that certain waters and more particularly stagnant waters in which there is decaying vegetable and animal matter, possess this poisonous property. Some of us may have experienced the nauseating effects of water from a pond or lake containing the products of decaying algae. It is scarcely necessary to add that such water is unfit for consumption. Moving water is, as a rule, free from this class of impurity. This is a phase of the water question that has not received from sanitarians the attention it deserves, but I am convinced of its importance in judging of the merits of a water for a city or house supply.

So far we have learnt that what we have to fear in our water supplies, is, first, the presence of disease germs, due to contamination with sewage, and secondly, those products of the decay of organic bodies from certain classes of matter, excretal or vegetable and which exert a toxic action on the system. A third form of pollution met with is the waste waters of manufactories which are run into the water course without proper purification. These refuse waters may contain organic or inorganic substances detrimental to health. Fortunately in Canada this kind of pollution is not often found, but in the protection of our lakes and rivers legislation must take cognizance of it and the laws preventing the discharge of such waste into possible sources of water supplies rigidly enforced.

In considering the role of rain and snow in Nature some two years ago, we learnt two facts of a fundamental character. The first was that the earth's moisture was in continual circulation. The ascension of water in the form of vapour, due to the heat of the sun, went on constantly, day and night, winter and summer, from earth and water surface alike. Ice and snow, as we saw, could be converted into vapour without visually passing through the liquid state. This vapour of water ascends until it reaches the higher and colder strata of the atmosphere where it is condensed to fall as rain, hail or snow, according to the atmospheric conditions prevailing at the time of the precipitation. This process of evaporation and condensation — distillation, in fact — is from the point of view we are considering to-night one of the greatest importance, for it is primarily one of purification. The sun, then, is the agent above all others that renders it possible to obtain a wholesome supply of drinking water, for the water in being converted into vapour leaves behind all those substances — mineral and organic — which it held in solution and descending gives us one of the purest forms of water found in Nature.

And, secondly, it was apparent that all our water supplies —lakes, streams, springs and wells—were directly dependent upon the fall of rain and snow, and therefore there was a very close relationship between the annual precipitation of a district and the volume of water which might be available for a water supply.

There are two properties of water that must be referred to, if only briefly, in order that we may intelligently consider the various classes of water that are suitable and wholesome for domestic use—its solvent power and its carrying power. Water is known as the universal solvent. It is because of its ability to dissolve gases and solid substances, whether they be inorganic (mineral), or organic, and the constant exercise of this power that in Nature there is no such thing as pure water —that is, chemically speaking. Pure water, as formed in the laboratory, consists solely of oxygen and hydrogen. All natural waters then, contain dissolved matter, some more, some less, and, speaking broadly, the nature of this matter—whether injurious or harmless to health—and its amount, will be determined by the character of the rock or soil it passes over or passes through. Thus we have soft waters from the Laurentian districts because the gneisses and granites are not easily soluble and impart but little mineral matter to the water; and we have hard waters in limestone districts, because the water with the aid of the carbon dioxide it has taken from the atmosphere is capable of exerting a very considerable solvent effect upon such rocks and contains as a result more or less lime in solution. Next to the sun, the soil is Nature's greatest water purifier, for it can remove by oxidation and filtration impurities in solution and suspension, but if the soil is choked with filth then the water in passing through it will dissolve such and be rendered foul.

The carrying power of water is secondary to its solvent power in this consideration of natural waters for drinking and household purposes. The descending rain, the storms, the spring freshets and floods, wash the surface of the land and carry much which they find there to the nearest stream or lake. Similarly the banks and channels of streams are eroded—even rocks may be slowly worn away and the detritus, the debris, borne in the turbid waters, perhaps hundreds of miles, to be deposited as their velocity is checked. In this way deltas of clay and silt and fine sand mixed with organic particles are formed at the mouth of great rivers, and areas of vast size and of extreme fertility built up. Since turbid waters, those with clay and silt in suspension, are not desirable for supplies, they must be subjected to filtration. If such waters possess no organic filth, the filtered and now clean water will be quite satisfactory.

(To be continued.)

LECTURES.

On December 12th, 1911, Mr. Alex. McNeill, President of the Club, addressed the members, in the Assembly Hall of the Normal School, on "Some Insect Friends and Foes." The attendance was good and the address was much enjoyed by those present.

Mr. McNeill explained that "Insect Friends and Foes" was not intended primarily as an entomological lecture. It was intended, in fact, as a suggestion for a more rational educational training for young people. The lecturer took the ground that inasmuch as physical strength could be developed only by the exercise of the muscle and intellectual strength by the exercise of the mental faculties, therefore, that was the best instrument of education that offered the larger number of opportunities for physical and mental exercise. Books and the ordinary routine of school work offered few opportunities for mental exercise within the scope of the immature intellect. Books were indeed indispensable in all advanced intellectual development, but as an instrument for education with children they had proved entirely inadequate. To illustrate the advantages that natural science offers, the lecturer introduced a large number of lantern slides giving numerous interesting phases of insect life and their co-relation with the every-day affairs of the fruit grower and farmer. The relation of insects to the pollination of flowers was illustrated, with diagrams of the flowers of the Clover, Iris, Ladies' Slipper and Yucca. The usefulness of the hymenoptera in the pollination of the apple blossom was illustrated by several pictures.

The development of the ordinary codling moth from the full grown larva, found all too frequently in Canadian apples, to the perfect moth, was given as an easy exercise and a most interesting one showing the various changes in the life of the insect. Reference was made in connection with each of this series of pictures to indicate the ease with which this could be turned to use as an instrument of education with even the younger children of public schools, and, of course, it was pointed out that the pupils never outgrew the problems upon which they could exercise their observi g and reasoning faculties; so that from the very youngest pupil to the most mature student, field-naturalists' excursions offered material for the most rational intellectual exercise.

Attention was also drawn to the Field-Naturalists' Club excursions in developing a love for outdoor life, with enthusiasm for pure air, pure water and sunshine.

THE OTTAWA NATURALIST

VOL. XXV. OTTAWA, MARCH, 1912 No. 12

FINAL REPORT OF THE JAMES FLETCHER MEMORIAL COMMITTEE OF THE OTTAWA FIELD-NATURALISTS' CLUB.

The Memorial Fountain, erected on the Central Experimental Farm, was unveiled on July 19th, 1910. Several hundreds of people were present at the ceremony, including some distinguished visitors from a distance. Official representatives of the Royal Society of Canada, the Entomological Society of Ontario and the Ottawa Field-Naturalists' Club were present, and took a prominent part in the proceedings. The Fountain, including the medallion, is the work of Dr. R. Tait McKenzie, of the University of Pennsylvania, Philadelphia, U.S.A.

The Memorial portrait, which is the work of Mr. Franklyn Brownell, R.C.A., was unveiled at an evening meeting of the Ottawa Field-Naturalists' Club on January 9th, 1912. It is an exceedingly good likeness of the late Dr. Fletcher, and, as most satisfactory arrangements have been made with the Municipal Library Board and the Librarian of the Carnegie Library, the portrait will be hung in a prominent place in this latter building.

CASH STATEMENT.

Receipts.

Total amount paid by subscribers		$1,838.85
Bank interest		22.61
		$1,861.46

Expenditure.

Cost of Memorial Fountain	$1,500.00	
Cost of Portrait, including frame	225.00	
Miscellaneous expenses: printing, envelopes, receipt forms, postage, travelling, etc.	136.46	
		$1,861.46

On behalf of the Committee,

ARTHUR GIBSON, Secretary-Treasurer.

Ottawa, January 23rd, 1912.

PASSENGER PIGEON INVESTIGATION.

February 14, 1912.

LIST OF REWARDS WITH CONDITIONS GOVERNING THEM.

ONE THOUSAND DOLLARS ($1,000) REWARD.—For first information, *exclusive and confidential*, of the location of a nesting pair or colony of passenger pigeons, anywhere in North America; when properly confirmed and if found by confirming party with parent birds and eggs or young UNDISTURBED:

Colonel Anthony R. Kuser will pay a reward of....$300
John E. Thayer will pay a reward of.....$700

For first nesting discovered thereafter in the following States will be paid by:—

John Burroughs, New York	$100
A. B. F. Kinney, Massachusetts	100
Anonymous, Massachusetts, for 2d find	100
Allan B. Miller, for 1st nesting found in Worcester Co., Mass.	20
Edward Avis, Connecticut	100
Harry S. Hathaway, Rhode Island	100
Worthington Society, New Jersey	100
John Dryden Kuser, for 2d nesting found in New Jersey	10
Henry W. Shoemaker, Penna. $200 (adds $25, if nest is protected)	225
W. B. Mershon, Michigan	100
R. W. Mathews, Minnesota	100
Ruthven Deane, Illinois	50
John E. Thayer, Me., N. H., Vt., Ont., Wis., $100 each	500
John Lewis Childs, for first three nestings not entitled to any of the above rewards, $200 each	600

The purpose of these offers is to secure an intelligent search of the American continent for breeding pigeons in the hope that, if found, the species may be saved from extermination.

All above rewards are offered solely and only for information of location of undisturbed nestings. We do not desire possession of any birds, alive or dead, but are working solely to save the free, wild pigeon.

To insure intelligence and good faith informants of nestings are advised to enclose or agree to forfeit at least $5 in case they have failed to identify the birds correctly. This is only fair, since the amount may cover but a small part of the costs occasioned by a false report. The money will be immediately returned, if the birds are found to be passenger pigeons (Ectopistes migratorius). In the case of nesting pigeons, there can be no excuse for sending in false reports. *Disregard all nests on*

the ground. The wild pigeon always nests in trees, generally 10 *feet or more from the ground.*

Priority of claim will be decided by time of receipt at post or telegraph office. Rewards will be equally divided, if two or more letters or messages bear record of same date and hour. All nestings within one mile of one another will be counted as one colony.

Please report all pigeons seen, giving *exactly* date, hour, number in flock, direction of flight. Unless absolutely certain that you know the Band-tailed, Viosca and Red-billed pigeons, do *not* report that you have seen the passenger pigeon in the Rocky Mts. or Pacific Coast region, from British Columbia to Mexico.

As soon as a pigeon nesting is surely identified write the undersigned, who will arrange for confirming party and for payment of the reward. All rewards not claimed by Oct. 31, 1912, will be withdrawn.

Signed, C. F. HODGE,
Clark University, Worcester, Mass.

DRINKING WATER AND HEALTH.

By Frank T. Shutt, M.A., F.R.S.C., Dominion Chemist.

(Continued from page 171).

Waters as used by towns or for isolated households, as on the farm, may be classified as follows:— Rain water; Upland surface waters; Ground waters or those of shallow wells; and Deep-seated waters, as obtained by drilling or boring and among which many springs may be placed.

Rain water. This can be caught and used as such. As a drinking supply little need be said of this source. In Canada, where in most districts, other and larger sources of supply are readily available, rain water is seldom used save for washing and laundering purposes, for which by reason of its extreme softness it is eminently suitable. Its quality or purity will depend on the condition of the atmosphere through which it falls; if in town we may expect it to contain soot and gases from which it would be comparatively free if falling in rural parts. Again, dirty roofs and eave troughs, storage tanks in which organic débris accumulate, all contribute towards making this supply foul and unfit for consumption—so that even a fairly pure rain water that has been stored is difficult to find. However, if fresh and clean, it is not at all unwholesome, though

not very palatable. If stored in vats or tanks these should be of cement and frequently examined and cleaned. The water for use should be passed through an efficient filter and boiling would be an additional safeguard, though the presence of disease germs would not naturally be expected.

Upland Surface Waters. These constitute the waters of our lakes and streams and are formed by the run-off from the lands, though to some extent, of course, these sources are fed by springs. By far the larger number of supplies of Canadian cities and towns are drawn from lakes and rivers and hence the importance of immediate and efficient legislation that will protect these natural bodies of water from sewage and other pollution. The fact should be emphasized that these natural waters are, almost without exception, eminently suited without any preliminary treatment for drinking and domestic use. But as our population increases and especially as cities and towns build up on the margins of lakes and the banks of streams, the necessity of adequate filtration becomes apparent. It will therefore be the part of wisdom from this on, not only to protect these waters from pollution as effectively as possible, but, also for those communities drawing upon them for their supply to establish filtration plants. Experience in other countries has shown that despite the most vigilant protective measures such waters may at any time, through accident or otherwise, receive excretal waste and become a source of danger, a menace to good health. It is now generally recognized by the highest authorities that filtration is imperative—a sine qua non—if the supply is at all seasons to be relied on as free from injurious bacterial life.

The nature of the country and the composition of the rocks of the catchment area will largely determine the character of these waters. Thus a limestone district gives rise to a hard water, a Laurentian area, with gneiss, granite and similar rocks, result in a comparatively soft water. Again the colour of these waters is largely determined by the presence or absence of swamps in the country from which they draw their supply. A colored water, that is, one brown or yellowish-brown, through the presence of dissolved peaty matter, though offending the aesthetic sense (for we all prefer a colorless water), may be perfectly wholesome and especially so when such is from a large body of quickly flowing water, as for instance the Ottawa river. There are very few cases of illness or indisposition on record —if indeed any that can be definitely traced to the consumption of these peaty waters from large, actively flowing waters, provided of course such have proven to be free from excretal pollution. These so-called peaty waters and from sources such as I have described, have shown themselves almost universally

to be perfectly satisfactory for city supplies, not only from their extreme softness (which means a considerable saving in soap and labor to the community) but from the hygienic standpoint. These waters keep well, for their dissolved peaty matter does not readily undergo further decay, is in fact remarkably stable. It is true that temporary indisposition frequently follows the use of these waters when one has been accustomed to a hard, colourless water, but it is equally true that the reverse happens. Any change in the character of the water consumed may bring about a slight derangement, for the system becomes habituated to a certain water and some persons are very susceptible, for a time, to any difference in its character. The case, however, with coloured waters from low-lying swampy, shallow lakes and ponds is very different. Such bodies of water being more or less stagnant, produce an abundance of vegetable growth largely algal, which under favourable weather conditions may rapidly decompose, giving rise to offensive and nauseating products. If, as frequently happens in summer, these decay products accumulate, in other words get ahead of growth that can utilize them, the water becomes foul and unfit for consumption. The result of drinking such water usually shows itself in an attack of diarrhoea or nausea. From these considerations it would be obvious that colour is not in itself a quality or factor that can be used alone in deciding upon the suitability of a supply. Leaving out of consideration sewage pollution, we may have on the one hand a comparatively colourless water but one in which algae and other low forms of life are present in large numbers and in which chemical analysis proves the presence of easily decomposable organic matter, and on the other hand a highly coloured peaty water from a large and quickly flowing river, and the former will be distinctly the inferior water, one that must be efficiently filtered and purified before it can be regarded as a wholesome, potable supply.

Ground Water. This is the rain and melted snow absorbed and retained by the soil and subsoil. It is the source that supplies the shallow, domestic well so commonly used on the farm homestead and in the village. When the surroundings are perfectly satisfactory from the sanitary standpoint, these wells are frequently a source of excellent water, but, when, as is usually the case, convenience to the house or farm buildings is alone considered in the location of the well, the water is seldom of first class quality and more often must be adjudged as quite unfit for consumption. On the larger number of farms we find these wells, usually between 10 and 25 feet in depth, sunk in the barnyard or under the stable or other outbuildings, or not very far from the privy (a most crude and unsanitary affair

as a rule), or near the back door, out of which the household slops may be thrown and near which the garbage heap with all sorts of refuse may be found. It is quite true that most soils, and more particularly those that are porous and well aerated (gravels and sands), possess filtering and purifying properties in a marked degree, but the soil surrounding wells located as we have described must in time become saturated with organic filth of a most objectionable character, and is then no longer able to purify but rather serves to more seriously contaminate the water passing through it to the well, which under such conditions may be said to act as a cess pit.

Further, we frequently find these wells become the watery grave for rats, mice, frogs and other small animals, the decomposing bodies of which render the water foul and unfit for use. Imperfect protection of the mouth of the well may allow the entrance of surface wash. Rotten crib work is another source of contamination. Other causes of pollution could be enumerated but enough has been said to justify the conclusion that the ordinary farm well is at the best a poor supply and should be abandoned for a safer, purer source. The examination in the laboratories of the Experimental Farms of hundred of samples of such well waters have shown that few of these wells furnish a supply that can be considered wholesome, by far the larger number must be condemned as totally unfit for use. Considering the location of most farm wells, it is not a matter of surprise that but a very small proportion of them yield water of sufficient purity to be classed as satisfactory. Many of these waters are colourless, bright, sparkling, clear and cool, but these qualities are no criterion and it is by no means uncommon to find waters possessing all these commendable properties and at the same time reeking with filth. Of course, if a well water becomes turbid after a rain, there is reason to reject it, for in this turbidity we have a sign that the soil is no longer able to do its work as a filter and purifier.

A precaution of very considerable value, towards protecting the well water from organic filth, is to line the well to a depth of say 10 or 12 feet to a thickness of say 6 inches with concrete or puddled clay. This lining should project some 6 to 12 inches above the mouth of the well. This prevents the direct inflow of wash and of water from the surface soil, in which the larger amount of putrescible organic matter is found and ensures a certain amount of filtration through clean layers of soil.

Another safeguard is to keep an area of say 50 yards radius round the well free from manure and all deposition of filth, (it should preferably be in sod), and this plan we would heartily recommend to those who are contemplating sinking a well for

household use or for watering stock. If the ground surrounding the well is an undisturbed area and free from all excretal waste, it will perform its function as a natural filter and the water may be very good. Especially is this the case if the soil is sand or gravel, for such will not only remove suspended matter and germ life, but will also foster the destruction by oxidation of the organic matter held in solution. A clay subsoil is far inferior to sand in its purifying effect.*

Deep Seated Waters. These are waters that have percolated through the soil and permeable rock strata until arrested by an impervious stratum. They may appear on the surface as springs, but are more commonly obtained by deep wells, driven or bored, possibly through several overlying impervious strata to the water bearing rock. If there are no fissures in these overlying strata and there is no opportunity for water to flow downwards between piping and the sides of the boring; a good water will in all probability, be obtained. While it cannot be taken for granted that a bored well will necessarily yield a good drinking water, it is the source of supply to be generally recommended for the isolated households. Examination has shown that they are capable of furnishing in the larger number of instances, and when proper precaution has been taken to exclude surface water, a supply of high organic purity and very low bacterial content. In certain districts we find these deep seated waters characterized by an excess of saline matter, rendering them unsuitable for domestic use; but when such is not the case the deep well undoubtedly constitutes a safer and better source of supply than the shallow, ground water well. With a pump actuated by a windmill, small gasoline or hot air engine, tanks can be filled in the farm buildings for the watering of the stock and in the farm house to supply the bath room and kitchen. Such an arrangement would mean much, not only in the matter of convenience and the saving of labor, but in the still more important matter of securing a supply that would lead to better thrift in the stock and better health in the family.

Before bringing this address to a close, I must answer though it may be briefly, one or two questions that have been handed me for reply.

1. Is a hard water injurious to health? The human system has a remarkable adaptability and though certain authorities have considered that a hard water is inducive to the formation of calculi there is very little evidence to support the statement.

* Analyses of well waters from farm homesteads are made free of charge by the Chemical Division, Experimental Farm, Ottawa, provided the samples are collected and shipped in accordance with instructions that are sent on application.

Cities having even a very hard water supply do not show the prevalence of any disease that can be attributed to the water and we may conclude that the lime compounds present do not work any injury to health. As already remarked sudden changes from one character of water to another, whether hard to soft or soft to hard, may cause disturbance in the system, but such will only be temporary. The system requires lime to build up its skeleton and for its other tissues and it may take it from the water as well as from the food; there is nothing to prove that the lime taken in the water is not as readily assimilable as that in the food stuffs we consume. Consensus of opinion points to a moderately hard spring water, in which all possibility of contamination is out of the question, as probably the best supply, but such unfortunately is very hard to find.

2. Is distilled water wholesome? The only argument that can be urged against its use for drinking is that it does not contain the necessary mineral elements for the building up of the tissues and for the replacement of the daily outgo of these elements. The answer is that in the ordinary, normal diet there is such an abundance of the mineral salts that the absence of them in the drinking water need cause no alarm. There is much to be said in favor of distilled water, as it should be free from all forms of organic matter and disease germs.

3. What means can the householder take towards making a suspicious water harmless? Undoubtedly the best plan is to boil the water for from 5 to 15 minutes. This is the most efficient safeguard that can be proposed for the individual. Household filters, though removing suspended matter, are seldom to be depended upon to deprive the water of germ life and at the best require constant attention and cleansing to be kept even fairly efficient. The addition of hypochlorite of lime, now largely used in the purification of city supplies is not readily applicable in the house and cannot be regarded as equal to boiling for the destruction of germs. The boiled water may be rendered palatable and the "flat" taste removed, by being allowed to cool in the open air.

And now in conclusion, I must emphasize two points. The first is the insidious character of polluted water. The danger that lurks in water polluted with excretal products is not always apparent. This fact must not be lost sight of. There may be no outbreak of typhoid fever, but it may be generally undermining the health. In far too many cases the well goes unsuspected until the victim is stricken down. The moral is, ascertain the purity of the supply.

And the second point is that there is abundance almost everywhere of pure water. There is no better watered country

in the world than Canada. We can unhesitatingly affirm that the normal waters of our lakes, streams and springs, our ground waters and our deep seated sources, are of the purest. It becomes our duty as communities and individuals, to preserve and protect them from pollution and to see to it that the water we drink is as irreproachable in quality as that with which Nature has supplied us.

THE IDENTITY OF THE BETTER KNOWN MIDGE GALLS.

By E. P. Felt, Albany, N.Y.

(Continued from page 167).

TRIBE OLIGOTROPHIARIAE.

The third vein in this group is well separated from the anterior margin of the wing, the antennal segments are short, cylindric, usually stemmed in the male, and the claws are simple or at least rudimentary. This latter character serves to differentiate the species from the preceding tribe. The food habits, like those of the Dasyneuriariae are somewhat general, though there is a much greater preponderance of bud galls.

Phytophaga Rond.

The antennal segments in this genus range from 12 to over 20, the flagellate ones being stemmed in the male and usually sessile in the female. The palpi are quadriarticulate. This genus is distinguished from the following by the third vein uniting with costa at the apex of the wing. Synonym: *Mayetiola* Kieff.

P. ulmi Beutm. The larvae live among the small, immature terminal leaves or inhabit leaf buds. Previously referred to *Cecidomyia* and *Mayetiola*.

P. violicola Coq. The pale yellowish larvae live in curled violet leaves. Previously referred to *Diplosis*, *Contarinia* and *Mayetiola*.

P. destructor Say. The yellowish larvae injure the stems of wheat and other grains under the leaf sheath. Widely known as the Hessian fly. Previously referred to *Cecidomyia* and *Mayetiola*.

P. rigidae O.S. Gall an apical or subapical enlargement on willow stems, fusiform in shape, about an inch long and tipped with a rather characteristic slender, curved beak. Previously referred to *Cecidomyia* and *Rhabdophaga*.

OLIGOTROPHUS Latr.

Antennal segments 13 to 20, the flagellate ones stemmed in the male, sessile in the female; palpi presumably triarticulate.

O. betulae Winn. The larva occurs in inflated seeds of white birch. An introduced species, previously referred to *Cecidomyia*.

RHOPALOMYIA Rübs.

Antennal segments 12 to over 20, the flagellate ones stemmed in the male, usually subsessile in the female; palpi uni- or biarticulate. Members of this genus display a marked preference for flower or bud galls, a large proportion of the species occurring upon solidago.

R. hirtipes O.S. The orange larvae occur in somewhat nut-like apical galls on stunted solidago shoots, or more commonly as smooth, brownish, subterranean swellings evidently developing from root stock buds and varying in size from ½ to 1½ inches in diameter. Described as *Cecidomyia*.

R. solidaginis Loew. A large apical rosette gall on solidago. Described as *Cecidomyia*.

R. racemicola O.S. Gall a greenish or reddish, subglobular, bud-like enlargement about .1 of an inch in diameter on solidago. Described as *Cecidomyia*.

R. anthophila O.S. Gall nearly cylindric, green, densely pubescent, about ⅛ of an inch long on solidago. Described as *Cecidomyia*.

R. antennariae Whlr. Gall a corm-shaped apical bud deformity about ⅛ of an inch in diameter on *Antennaria*. Described as *Cecidomyia*.

R. tridentatae Rübs. Produces an apical bud gall on *Artemisia tridentata*.

R. alticola Ckll. Gall a subglobular, grayish, woolly enlargement; diameter ¼ to ½ inch, on *Artemisia*. Described as *Cecidomyia*.

R. gutierreziae Ckll. Gall a pale green, fusiform or suboval swelling in the flower heads of *Gutierrezia*. Length ⅓ inch, diameter ⅛ inch.

R. bigeloviae Ckll. Reared from a hollow stem gall on *Bigelowia*. Described as *Cecidomyia*.

R. chrysopsidis Lw. The gall is apical, light brown, irregular, woolly, about ¾ of an inch in diameter and occurs on *Chrysopsis mariana*. Described as *Cecidomyia*.

TRIBE ASPHONDYLIARIAE.

This tribe comprises mostly large, heavy-bodied insects easily recognized by the long, cylindric, sessile antennal segments

and the simple claws. The species breed largely in flower buds or fruits.

ASPHONDYLIA H. Lw.

Antennal segments 14, flagellate sessile, cylindric, the distal ones in the female reduced, palpi uni- to triarticulate, terminal clasp segment of the male genitalia bidentate, ovipositor of the female with the distal portion aciculate.

A. globulus O.S. Stem gall, globular or spherical; diameter ½ to 2 inches; on *Helianthus*.

A. bethelí Ckll. The larvae occur in the swollen fruit of *Opuntia*.

A. monacha O.S. Produces a small apical rosette gall on *Solidago lanceolata*. It may also occur in an oval chamber between two adhering developing leaves, and has been reared from dwarfed aster heads. Synonyms: *A. recondita* O.S., *A. solidaginis* Beutm. and *A. patens* Beutm.

A. antennariae Whlr. Gall a corm-shaped bud gall ¼ to ½ an inch in diameter on *Antennaria*. Described as *Asynapta*.

A. autumnalis Beutm. A globular, irregularly rounded bud gall on *Helenium*. Length ¾ to 1¼ inches, diameter about ½ inch.

A. atriplicis Ckll. An irregular twig gall on *Atriplex*. Length ½ inch, diameter ¼ inch. Described as *Cecidomyia*.

A. conspicua O.S. Gall an irregular, subglobular enlargement some 2 inches in diameter, of the flower head of *Rudbeckia*.

SCHIZOMYIA Kieff.

Antennal segments 14, sessile or subsessile, the flagellate ones in the male with remarkably stout, elevated circumfili; palpi quadriarticulate; the basal clasp segment of the male lobed distally, the terminal clasp segment irregular. Antennal segments of the female much as in *Asphondylia*, the apical portion of the ovipositor aciculate.

S. coryloides Walsh & Riley. Gall a roundish mass 1¼ to 2½ inches in diameter of from 10 to 50 opaque, woolly-pubescent, fusiform or sometimes flattish-oval, green galls, each from ½ to ¾ of an inch long; on grape. Described as *Cecidomyia vitis-coryloides*.

S. pomum Walsh & Riley. Gall depressed, subspherical or flattened. The young gall is green, succulent, credited with possessing a pleasant subacid flavor and covered with a fine pubescence. The fully developed gall has 8 or 9 longitudinal ribs somewhat like those of a muskmelon and within a number of longitudinal cells arranged in two tiers; on grape. Described as *Cecidomyia vitis-pomum*.

CINCTICORNIA Felt.

Antennal segments 14, sessile, the flagellate ones of the male with numerous low, regular circumfili, those of the female with two to six transverse, anastomosing circumfili; palpi quadriarticulate; terminal clasp segment of the male genitalia transversely and evenly serrate. Ovipositor stout, tapering to subacute, minute lobes. This genus appears to be confined very largely, if not exclusively to oak leaf galls.

C. pilulae Walsh. Gall reddish brown, coarsely reticulate, thick-walled, irregularly subglobose, about ½ of an inch in diameter, depressed or fused to form lobulated masses on oak leaves. Described as *Cecidomyia quercus-pilulae*.

C. symmetrica O.S. is possibly identical with the above. It belongs, with very little question, to this genus. Described as *Cecidomyia*.

TRIBE ITONIDINARIAE.

The more characteristic members of this tribe are easily distinguished by the usually long, thickly haired antennae having 14, rarely 12 segments, the flagellate segments in the male usually binodose, and with two or three circumfili, the latter generally with greatly produced loops; palpi uni- to quadriarticulate; claws simple or toothed. This very large tribe includes many diverse forms.

GROUP BIFILI.

This subtribe is easily distinguished by the presence of but two circumfili on the flagellate antennal segments of the male; the nodes are equal or nearly so.

CONTARINIA Rond.

The third vein unites with the interrupted costa at the apex of the wing; the palpi are quadriarticulate; the lobes of the dorsal plate taper strongly and are subacute; the ovipositor is long and filiform.

C. johnsoni Sling. The small, yellowish larvae occur in deformed grape blossoms. Described as *Cecidomyia*.

C. virginianiae Felt. The yellowish larvae occur in deformed, bladder-like fruit of the chokecherry. Described as *Cecidomyia*.

C. rumicis Loew. The reddish larvae infest the seeds of *Rumex*. An introduced European species.

C. sorghicola Coq. The yellowish larvae occur in the seeds of *Sorghum* and related plants. Described as *Diplosis*.

C. pyrivora Riley. The yellowish larvae occur in young pears. Described as *Diplosis*.

C. setigera Lintn. Reared from small, irregular, subovate, downy galls on muskmelon. Described as *Diplosis*.

THECODIPLOSIS Kieff.

Separated from Contarinia by costa not being interrupted at its union with the third vein and by the long, broadly lobed dorsal and ventral plates in connection with the stout, usually very long ovipositor.

T. ananassi Riley. Reared from a brown gall with a length about $\frac{3}{4}$ of an inch on Cypress twigs. Described as *Cecidomyia cupressi-ananassi*.

T. liriodendri O.S. A circular blister on tulip leaves. It has a dark brown center surrounded by a light brown, irregular area; diameter $\frac{1}{4}$ inch. Referred to *Cecidomyia* and *Diplosis*.

GROUP TRIFILI.

This subtribe is easily recognized by the presence of three usually well developed circumfili on the flagellate antennal segments of the male. The nodes are generally unequal and in some extreme forms the distal enlargement is almost divided.

YOUNGOMYIA Felt.

Flagellate antennal segments of the male trinodose, the distal enlargement being distinctly divided and sometimes by an appreciable stem; palpi quadriarticulate; wings large, rather hairy, the third vein uniting with costa well beyond the apex of the wing; legs long, claws stout, unidentate, the pulvilli about half as long as the claws. The terminal clasp segment of the male is unusually long; the ovipositor of the female is short, the lobes large and orbicular.

Y. umbellicola O.S. The yellowish larvae occur in enlarged blossoms of elder. Described as *Cecidomyia*.

APHIDOLETES Kieff.

This genus is easily recognized by the greatly produced setae and circumfili on the dorsal surface of the flagellate antennal segments in the male. It is readily separated from the allied Bremia by the well developed middle circumfilum. Anterior claws unidentate.

A. cucumeris Lintn. Reared presumably from plantlice on cucumber. Described as *Diplosis*.

CLINODIPLOSIS Kieff.

Antennal segments 14, binodose. Palpi quadriarticulate. The terminal clasp segment is not abnormally produced or subfusiform. The ventral plate is produced, emarginate, the dorsal

plate deeply cleft and triangularly emarginate. The ovipositor is short. Anterior claws unidentate.

C. rosivora Coq. The larvae lie just under the sepals of rose buds, usually singly, though sometimes in clusters of five or six. Described as *Diplosis*.

C. caulicola Coq. The larvae are rather abundant in the basal portion of the stems of Iceland poppies. Described as *Diplosis*.

CARYOMYIA Felt.

Allied to Hormomyia but differing by the thorax not being greatly produced over the head and by the presence of but 14 antennal segments. The males may have the flagellate antennal segments binodose or cylindric and subsessile and invariably with three low, stout circumfili. The antennal segments of the female are cylindric and with two circumfili; palpi tri- or quadriarticulate; wings rather broad, the third vein joining costa at or near the wing apex; claws simple, the pulvilli well developed. The ovipositor of the female is short, triangular and with minute lobes apically. This genus appears to be confined to hickory leaf galls.

C. caryae O.S. Gall globose, thin-walled, yellowish green or brown; diameter .1 inch, on hickory leaf. Referred to *Diplosis*, *Cecidomyia* and *Hormomyia*.

C. holotricha O.S. Gall small, globular, fuzzy, rust red; diameter .1 to 1-5 inch, on hickory. Referred to *Cecidomyia* and *Hormomyia*.

C. sanguinolenta O.S. Gall conical, with a distinct nipple, greenish and variably tinged with purplish or blood red, on hickory leaves. Described as *Cecidomyia*.

C. tubicola O.S. Gall a green or blackish, hollow tube about 1-5 of an inch long, growing at right angles from a socket in hickory leaves. Referred to *Cecidomyia* and *Hormomyia*.

C. persicoides Beutm. Gall irregular, monothalamous, hairy, ¼ inch in diameter and usually clustered on the midrib of a hickory leaf. Described as *Cecidomyia*.

Most of the other hickory leaf galls described are probably made by a species of *Caryomyia*, though other midges have been reared from these deformities.

HORMOMYIA H. Lw.

Typical members of this genus may be most easily recognized by the mesonotum being greatly produced over the head. The antennal segments vary in number from 14 to over 20, the flagellate ones in the male binodose and with short circumfili; palpi uni- to tri- or quadriarticulate. The large forms probably live on sedges.

H. verruca Walsh. Gall a characteristic subconic enlargement arising in clusters from the midrib or some of the principal veins of willow leaves. It is about .1 of an inch in diameter, greenish yellow, monothalamous, subglobular and tapering to a truncate, frequently lipped, free extremity. Not a typical *Hormomyia*. Described as *Cecidomyia*.

Lestodiplosis Kieff.

Usually yellowish, frail species with spotted wings, most easily recognized by the triangular lobe at the internal basal angle of the basal clasp segment of the male.

L. grassator Fyles. The pale orange larvae prey upon Phylloxera. Described as *Diplosis*.

Parallelodiplosis Rubs.

Mostly pale yellowish or orange species, distinguished by the long, narrowly rounded ventral plate of the male genitalia.

P. caryae Felt. Reared from several hickory leaf galls and probably an inquiline with various species of *Caryomyia*. Previously referred to *Cecidomyia* and *Clinodiplosis*.

Obolodiplosis Felt.

A large form remarkable for the greatly expanded orbicular dorsal plate of the male.

O. robiniae Hald. The larvae occur in marginal leaf rolls of *Robinia*. Described as *Cecidomyia;* also as *O. orbiculata*.

Itonida Meign.

Antennal segments 14, those of the male binodose, the nodes unequal; circumfili three. Palpi quadriarticulate. The third vein unites with the margin well beyond the apex of the wing. The pulvilli are longer than the simple claws, while the dorsal and ventral plates of the male genitalia are deeply bilobed. Ovipositor rather long, the lobes narrowly oval.

I. tritici Kirby. The orange larvae develop in the heads of wheat and some other grains. Widely known as the wheat midge. Previously referred to *Cecidomyia* and *Diplosis*.

I. verbenae Beutm. The larvae occur in terminal rolled leaves of white or nettle-leafed Vervain. Described as *Cecidomyia*.

I. catalpae Comst. The yellowish larvae attack the pods and frequently deform the young shoots of Catalpa. Previously referred to *Diplosis* and *Cecidomyia*.

I. tecomiae Felt. The pale yellowish larvae roll the leaves of the trumpet vine. Previously referred to *Bremia* and *Cecidomyia*.

I. resinicola O.S. The pale orange larvae occur in pitch exudations on hard pine. Previously referred to *Diplosis* and *Cecidomyia*.

I. resinicoloides Wlms. The larvae occur in resinous exudations on the Monterey pine. Described as *Cecidomyia*.

I. foliora Rssl. & Hkr. Gall the folded edge of oak leaves similar to that described for *Cecidomyia erubescens* by Osten Sacken. Described as *Cecidomyia*.

CECIDOMYIA.

This term is employed here in a general sense to include galls which can not be satisfactorily referred to any well defined genus, and also adults with inadequate descriptions.

C. caryae O.S. Probably an inquiline in the typical *Caryomyia caryae* O.S. gall on hickory. This species is not identical with our *Clinodiplosis caryae* or *Mycodiplosis holotricha*, both probably inquilines in *Caryomyia* galls.

THE GRAY OR ARKANSAS KING BIRD, *TYRANNUS VERTICALIS*.

During a residence of now more than ten years in Pilot Mound, I do not remember seeing *Tyrannus verticalis* until May 21st, 1909, when I was visiting a patient just north of Crystal City. On the wire fence by the roadside sat a gray-backed bird whose tail was nearly black but whose belly and especially the lower belly was sulphur yellow, fading to a lighter shade breastwards. Again, on May 21st, 1910, and May 22nd, 1911, I have noted the first appearance of this bird. In 1910, however, a pair nested in Pilot Mound, while in 1911, not only did two pairs nest on the roadside trees in town, but I saw specimens in Crystal City and Clearwater. Prof. W. W. Cooke of the U.S.A. Biological Dept., to whom I send annual records of the spring migration of birds, tells me that S.W. Manitoba constitutes the far N.E. limit of the range of *T. verticalis*. It is a very charming bird, built on graceful lines and less truculent than the aggressive *T. tyrannus*, which will bully the robins and humming birds. While we were playing tennis in August at the close of the nesting season, both old and young birds wheeled about the space between our stop-netting and the public school roof. The Boy Scouts will protect these and our other birds from nest thieves.

H. M. SPEECHLY,
Pilot Mound, Man.

NOTES—CONCHOLOGICAL AND OTHERWISE.

In the January *Nautilus*, Dr. Sterki describes a new species of mussel, under the name *Musculium declive*. A number of the specimens upon which the species is based were obtained in the County of Renfrew; the others were found in Michigan. The Renfrew shells were discovered in September, 1911, in a lake about a mile west of Brudenell, known locally as Lake Gorman. It is a beautiful sheet of water set among the Opeongo Hills which though depleted of the pine still preserves on all sides of the lake the aspect of the primeval forest. About ten years ago when charged *inter alia* with the administration of the Fish and Game Department of Ontario, I arranged for the seining at Long Point, Lake Erie, of large numbers of adult small-mouthed black bass, and the distribution of them in suitable localities—barren or depleted—throughout the province. At the request of my old friend, the Rev. F. J. French, of Brudenell, I sent him about fifty fish to stock Lake Gorman, which contained no game fish. Many died *en route* between the railway at Killaloe and the lake. Probably not more than twenty were living when placed in its water. The few, however, found their new home so congenial that they increased and multiplied to such an extent that the lake now fairly swarms with this gamiest of inland fishes. I have in common with my good friend a regard for these bass which is almost paternal; yet when an opportunity presented itself last September of accepting his oft repeated invitation to revisit Brudenell, neither he nor I allowed our interest in the bass to interfere—at least for a time—with our more primitive instincts. The sport was glorious. Every fish was a fighter, leaping repeatedly from his element into ours. It would have been sinful to catch more than we had use for, and we refrained from any excess. It then occurred to me that the lake might yield other specimens than *Micropterous dolomieu*. I looked for and found shells in abundance. The only large mussel was *Unio complanatus*. A fine *Physa*, probably *P. sayii* Tappan, spotted the rocks near the boathouse, and with it was a remarkably beautiful, pearly form of *Planorbis bicarinatus*. On the sandy beach at the northern end of the lake occurred a large, and, I think, undescribed, *Sphærium*. It differed widely from the other large *Sphæria*,—*S. sulcatum* and *S. rhomboideum*. Many were collected and cleaned. They were regarded as particularly precious, and were put away with that excessive care which, like ambition, sometimes "o'erleaps itself and falls on t'other side." They have not yet been found.

The surprise of the day—for me—was the finding of another

undescribed shell—an exquisite, brightly-colored, little *Musculium*, mainly occurring in the outlet of the lake. Specimens were not numerous and in sifting through the hand-dredge the coarse gravel in which they seemed least rare not a few were broken. A nice set, however, was procured in the time I could avail myself of without trespassing unduly upon the patience of my waiting host, who pityingly regarded me with the compassion due to a naturalist exercising his hobby in the presence of a sane onlooker. I fear I should never have regained my friend's good opinion had I not later that evening made just the right lead to his double of a no trumps declaration, and thus enabled him, from love, to make game and rubber.

A characteristic lot of the little mussels was sent to Dr. Sterki. He recognized it as a new species which he had described in MS from specimens obtained in Michigan. His description has now been published, but it is of interest only to the few who, leaving the broad and well-trodden ways so many follow in nature study, venture almost alone into the sequestered fields which are so full of freshness and permanent delight.

I may add, as of interest to the ornithologists of the Club, that a large heronry exists in a grove of tall hemlocks at the south end of Lake Gorman. None of the birds, *Ardea herodias*, were seen on the occasion mentioned.

F. R. L.

PORTRAIT OF THE LATE DR. JAMES FLETCHER.

On the afternoon of 28th February, in the presence of several members of the Memorial Committee, the portrait of the late Dr. James Fletcher, painted by Mr. Franklyn Brownell, R.C.A., and unveiled at a recent meeting of the Ottawa Field-Naturalists' Club by the Hon. Sydney Fisher, was hung in the Carnegie Library. The portrait, which is an excellent likeness, has been much admired by friends of the late Dr. Fletcher. It is a graceful tribute to the memory of one who was greatly beloved in this city and one who with much enthusiasm did most valuable pioneer work in encouraging a love for the study of Nature among our citizens.

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